NATURE MAGAZINE

June-July, 1943 35 Cents Vol. 36, No. 6

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To the enemy command the star-marked bomber these nine young men will fly is a many-eyed creature of destruction. Its "eyes" of optical glass, fixed on the stars or sun, lead it straight as the crow flies to its objective. Then other optical "eyes" look down and, where they look, ton upon ton of American-made TNT blossoms red in the dust of a shattered Axis dream. Still other "eyes" make the photographic record of its accomplishments to give lie to claims of "only slight damage" . . . to chart a path for others to follow.

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That is the seldom heard story back of the reports of successful bombing missions, of American planes limping homeward, riddled by shellfire, but still able to fly and fight and to bring their nine young men safely home. That is the satisfying story of the research, quality control and precision inspection that optical instruments alone have made possible.

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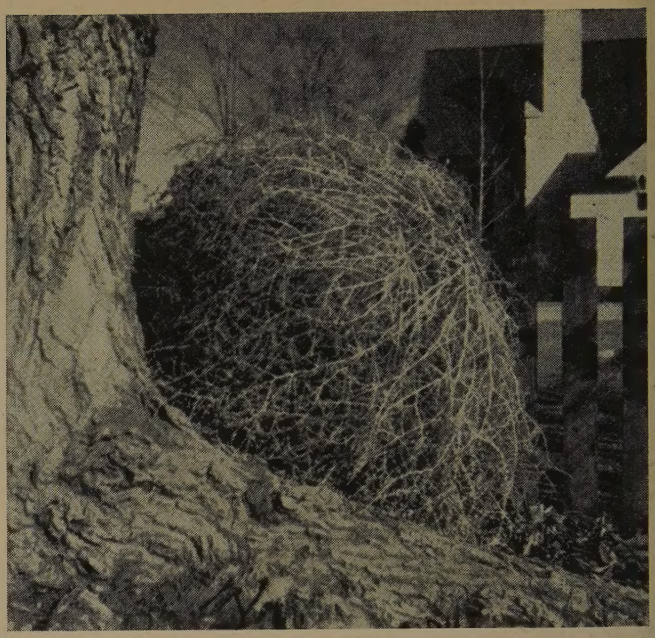
Camera Trails

By NORRIS W. HARKNESS



Tumbleweed has been a subject of poetry and prose but to many it is only a name. To westerners, however, the little six-inch balls, and the great three- or four-foot spheres, wandering over the landscape, are familiar. The one pictured here is three feet in diameter and had blown over several fences and finally come to anchor between tree and fence. It weighed less than three pounds.

Photography and Conservation

IT IS NOT often that we find an opportunity to have fun and help along a great cause at the same time, but Nature photographers, being more fortunate than most, often have such an opportunity. It gives them a chance to make true, story-telling pictures with a definite purpose in mind, and to find in those pictures all the various kinds of camera work that make our photography the all-absorbing fun it is.

The idea started with a visit to a monthly meeting of the Washoe Fish and Game Association in Reno, Nevada, where the men and women of all classes and occupations have banded together because of their interest in the wildlife of their area. From Peter Ferguson, the president of the Association, down to the newest member, all of them are enthusiastic missionaries of the American spirit and the American way of life. Every one of them is personally excited over the propagation and conservation of fish, bird, and mammal life in their county.

Theirs is not a passive, let-the-other-fellow-do-it interest. They offer their money and their work for the sole purpose of making their section of Nevada and the Truckee River the home of more and more deer, trout and birds each year. They exert their influence toward proper conservation laws; they have, by the existence of the Association, the practical effect of unofficial police to safeguard fish and game and enforce these laws. They both work and pay to improve the natural homes of fish and game.

Perhaps a similar association, or a Nature club in your county, does many of the same things, and that is where you as a Nature photographer can help. The conservation of fish and game requires money, work, and the active interest of as large a part of the community as possible, and the enlistment of those factors requires better publicity than most such associations seem able to obtain for themselves. A few of them realize the value of pictures, and still fewer have made some use of them. But the great majority need you and your camera to help them sell their conservation program to the general public.

Perhaps your local association has fish hatcheries, or cooperates with the state authorities in distributing the young fish in the lakes and streams of your vicinity. Perhaps they operate whole farms to raise birds, or help individual farmers to do so. Perhaps they have established game or duck refuges, or are working to feed migrant birds in winter, or to rescue ducks from the sure death of oily ocean waters. Perhaps they are engaged in other conservation activities that your community should know about.

No matter what their efforts may be in these directions, they will provide good pictures for your own collection, for publication, or other publicity use by the association. They will be exciting pictures to make. The subjects will sometimes call on all your skill and ingenuity as camera technicians, although usually all that is needed is average technical ability and the willingness to wait for and seize the best moment for the exposure. None of the problems are beyond the ability of the Nature photographers who read this and who really want to make pictures both attractive and useful.

There are, of course, the shots of the different animals in their natural habitat, made either with the aid of stalking or night sets with trap-operated flash; pictures of the kind of brush patches the farmers could leave in fence corners and fallow land for bird shelters; shots of game trails, and the activities of raising and distributing any young that may be handled. Forest fire control is another part of the work in many areas, and both the work itself, and the fire and its results, are tops as camera material.

None of these pictures need skill, equipment or method that have not been discussed in Camera Trails in recent months, but the chief requirement is your own willingness to do the necessary work and the patience to carry it out well. A camera, fairly fast film, a lenshood, a medium yellow filter and the desire to use them for a good cause is all you need. Ninety percent of the pictures will need average snapshot exposures with the box-camera technique we have talked about here so often, and half of those will be posed at least as far as the human subjects are concerned.

But you will need the interest, ingenuity and picture-sense that converts casual, uninteresting snapshots into pictures that will attract attention when they are shown to the public in the newspapers or in exhibitions of Nature photographs. Since using and cultivating those talents is one of the greatest "funs" in photography, you are going to enjoy cooperating with your association and its members will be glad to cooperate with you. But it can not happen until you start the ball rolling, and now is the finest time to do it.

The Question Corner

Mrs. F. N. W. writes from Colchester, Connecticut, where "deer run all over the place" that her synchronizer does not synchronize well enough to get pictures

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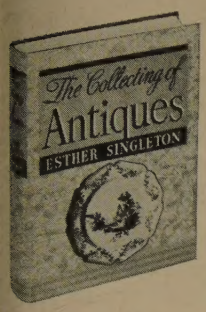

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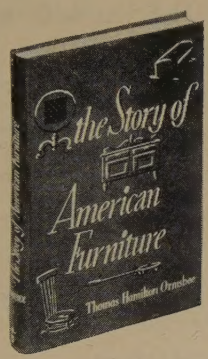

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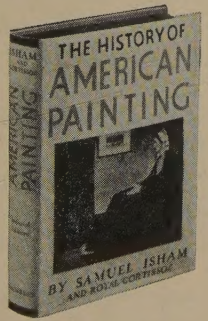

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of the deer at night since the outfit must be used as a hand flash. She tells of one evening when she was on one side of a stone wall while a deer grazed just beyond it, and asks how she can get such pictures.

ANS.—Open flash is perfectly usable at night for any animals you can approach as closely as Mrs. W's deer. It is dark enough to keep the shutter open without affecting the film, and the flash of the bulb is short enough to stop any ordinary motion, taking approximately 1/50th second for all the light. The procedure that has worked well for many Nature photographers is simple. The camera is focused on the distance at which the picture probably will be made and the diaphragm is set at whatever stop the bulb-film chart calls for. The shutter is set on either "B" or "T"—bulb is usually better—and the synchronizer is not connected with the shutter, although the battery case and the bulb may be attached to the camera as usual.

To operate the outfit for open flash simply aim the camera, using the viewfinder if there is enough light, and press the release to open the shutter. Then push the button that fires the bulb and close the shutter again. The picture will be in the bag, and be just as satisfying as though the whole synchronizer were working perfectly.

Of course any hand flash outfit may be used in the same way, but fastening the case to the camera will help to keep the camera steady and avoid misses. Having everything fastened into one piece is a big help when stalking at night.

F. D., Elgin, Illinois, writes: "I have heard that the plan of increasing the exposure time by two each time the diaphragm is closed one stop, and vice versa, works only through the middle range of shutter speeds and results in under-exposure whenever the time is very short or very long for extremely large or small apertures. Is this true and does it make any difference in my Nature work?"

ANS.—The law does fail at the extreme ends of the time range, but the loss in negative density is too small to matter except in the laboratory. You might notice some difference at shutter speeds in excess of 1/1000th second with a correspondingly small aperture in bright daylight, but the chances are that errors in calculating the exposure in the first place would make far more difference. This is just another fact that is technically correct but of no use to the amateur.

To People who want to write *but can't get started*

Do you have that constant urge to write but the fear that a beginner hasn't a chance? Then listen to what the editor of Liberty said on this subject:

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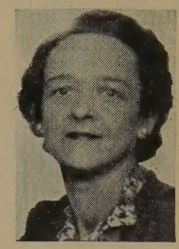

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PUBLISHED BY THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and
Devoted to the Practical Conservation of the Great Natural Resources of America

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NATURE MAGAZINE is published monthly, October to May, inclusive, bimonthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C., U. S. A., and accepted for mailing purposes at the special flat rate of postage provided for in the United States Postal Act of October 3rd, 1917, and February 28th, 1925. Additional entry at Greenwich, Conn. $3.00 a year; foreign $3.75.

Publication and Editorial Office, 1214 16th Street, N.W., Washington, D. C. Additional Office of Publication, Greenwich, Conn.

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Indiana State Parks

Tippecanoe River State Park, a 6232-acre tract along the Tippecanoe River in Pulaski County, and Versailles State Park, a 5310-acre area in Ripley County, have been turned over to the State of Indiana by the National Park Service. Both areas had been acquired by the National Park Service as a part of a program for the retirement of submarginal land. They have been developed in cooperation with the State Department of Conservation, and will be administered by that department through its Division of State Parks.

Connecticut State Bird

In the closing days of March, Governor Raymond E. Baldwin of Connecticut signed a bill officially recognizing the American robin as the official bird of the State, thus swelling the ranks of States having taken such official action. The robin was championed for this honor by the newly-elected Lieutenant-Governor of the State, William L. Hadden.

South Dakota Bird

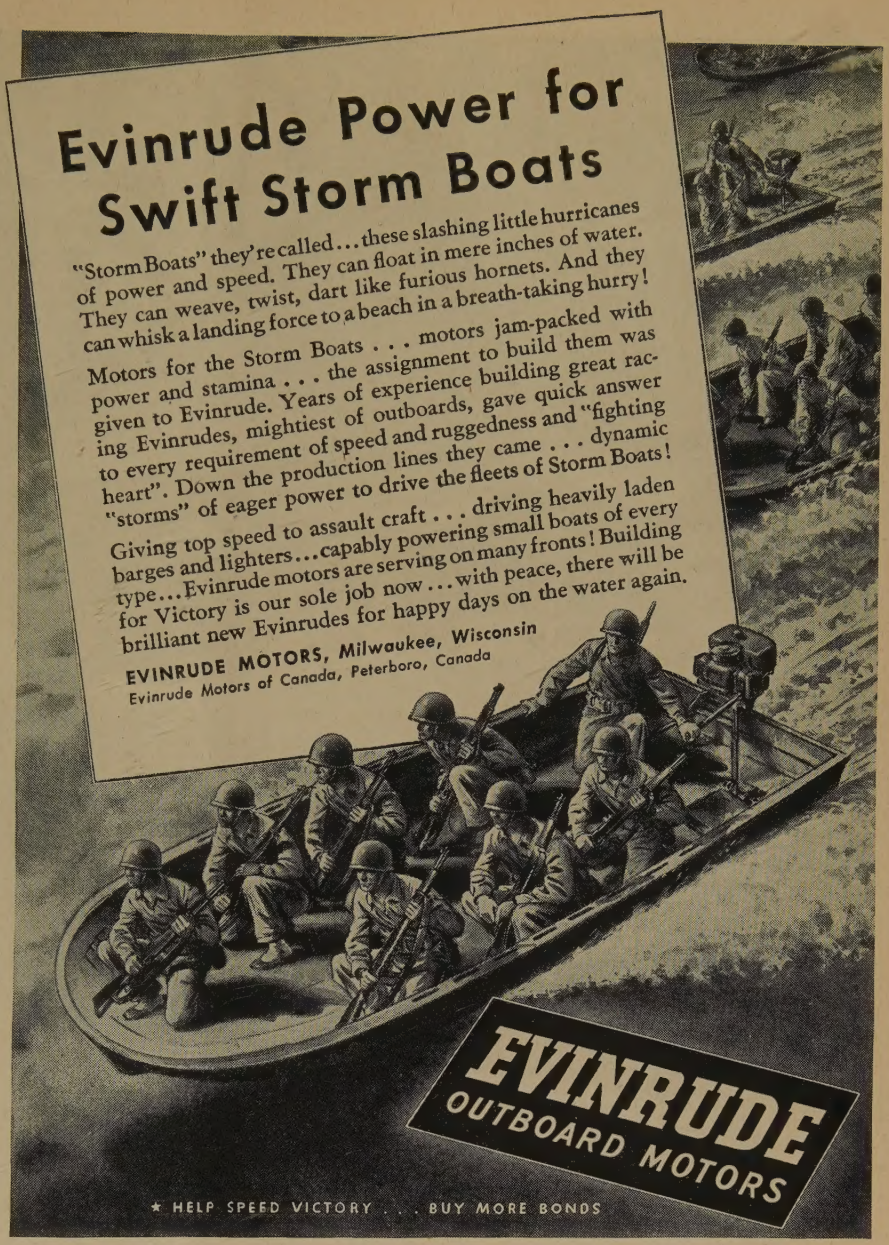
The Legislature of South Dakota has now officially designated the ring-necked pheasant as the official State Bird. Hitherto there was no official bird, the horned lark being, by tradition, considered to hold that post.

California Beavers

The total beaver population in California today is estimated not to exceed 1300 animals, although this valuable fur-bearer once was numerous in the State. This and other facts of its decline and present condition are brought out in a recent pamphlet, *The Status of Beavers in California*, published by the California Division of Fish and Game. It is the work of Donald T. Tappe.

War-winning Ideas

If you have any ideas that you feel may help to win the war and speed the coming of peace, Victory Center, 745 Fifth Avenue, New York City, is a clearing house for such ideas. Every idea submitted is carefully evaluated by a staff of distinguished consultants and forwarded to appropriate agencies for action.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(From story by Sgt. James W. Hurlbut, Marine Corps Combat Correspondent)

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Contents Noted

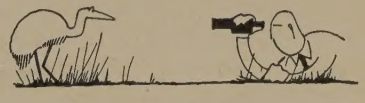
Spurred by demand for timber and high prices, logging operations are eating rapidly toward that magnificent stand of giant sequoias known as the South Calaveras Sequoia Grove. There is a smaller North Calaveras Grove that was made a state park in 1931, thanks to the Save-the-Redwoods League, the Calaveras Grove Association, and the State of California. The South Grove, however, is privately owned, and the owning company, although not wishing to destroy the grove, has to cut timber to stay in business. The South Grove adjoins the Stanislaus National Forest, and a few of the great trees lie within the borders of that forest. So, to meet this threat, the Emergency Conservation Committee comes forward with a solution. Let a law be passed directing the United States Forest Service to exchange merchantable timber within the Stanislaus Forest for the South Grove and the four miles intervening between the two groves, thus making one large and beautiful state park. It is pointed out that the states in many cases have provided lands and money for national parks and this is a chance for the Federal Government to reciprocate. It certainly sounds as sensible as pay-as-you-go taxation.

As this is written the California Roadside Council, and other groups interested in the decent appearance of California's roadsides, are battling against a bill that would wreck the fine progress made through county highway zoning. Although a gentlemen's agreement had been reached with the billboard interests not to propose legislation for the duration, a bill modifying the requirements for set-back of billboards was quickly loaded with amendments by the industry's lobbyists. The moral of this is that one should be sure that the other fellow's word is worth anything before entering into an agreement with him.

Not being mechanically-minded ourselves, our wonderment is the greater over the myriad mechanical aspects of this war. This is brought home to us through a booklet entitled "Bausch and Lomb at War," from, curiously enough, Bausch and Lomb. It describes in word and picture many of the delicate yet vital instruments that are being manufactured as a part of the complicated war equipment of this day—range finders, stereo trainers, star projectors, anti-aircraft height finders, searchlight mirrors, battery commanders' telescopes, photo lenses, gun sight aiming point cameras, multiplex projectors, binoculars, bubble sextants, aviators' goggles, anti-tank gun sights, spotting scopes, ophthalmic instruments, mobile optical units and other items that security forbids mentioning. It is truly an intricate war.

One hundred million hours are a lot of hours, but that is what the Boy Scouts of America have pledged to provide to produce and conserve food. "Scout power" is being turned loose to grow, care for, and harvest crops from farm and from garden. The boys have swung into action all over the country, and there can be no doubt in anybody's mind that the Free Youth of America will do a job that could never be achieved by the regimented Hitler Youth of Nazidom.

One of the fascinating things about bird study is that there is always the probability of surprise; of new discovery; of adding to existing knowledge on distribution and such data. According to *Birds of North Carolina*, by T. Gilbert Pearson and the Brimley Brothers, April 7, 1927 was the earliest recorded date for appearance of American egrets in the State. Now Bill Keziah reports from Southport, North Carolina, that a considerable number of the birds were seen there on March 5, and may have been there earlier but not noted. In fact, on March 23 nests were found with two and three eggs in them.



Of our National Parks, Director Newton B. Drury, in the annual report of the National Park Service, pertinently says:

"The wisdom of the Nation in preserving these areas is clearly evident on the American continent today as increased demands upon our natural resources are invading and forever changing the native landscape. The national parks and monuments may soon be among the few places in the world where forests continue to evolve normally, where animal life remains in harmonious relationship to its environment, and where the ways of Nature and its works may still be studied in the original design." R. W. W.

"In Nature there is strife . . . Yet each contestant seeks only that which Nature intended it to have."

When we consider Man's history we find that the "tooth and claw" of wild Nature are—

Not So Red

Frontispiece by the Author.
Illustrations by Catherine Klepper.

By EDMUND J. SAWYER

Edmund J. Sawyer, naturalist and Nature artist, has spent a lifetime in intimate contact with Nature. Many months have, indeed, been spent alone with Nature in a solitude that gave him not only an opportunity to know his subject but to put a fine and penetrating mind to work. Even after this article was written he left for months of snow-bound loneliness as an airplane spotter on a western mountaintop. We feel that this article is significant, provocative and a complete answer to those who have sought an excuse in Nature for Man's incapacities to live with other men.

THERE are those—usually professional soldiers and generally Prussians—who present a plausible and elaborate thesis that war is the normal and proper condition of human society. Periods of peace, they say, are mere interludes in the necessary slaughter of man by man. There seems to be grave danger that the world at large may accept this doctrine, and supinely conclude that human warfare, with all that it implies, is inevitable, and must be listed with the ocean's tides, eclipses of the sun and other unalterable phenomena of Nature. And they point to Nature's own "warfare" as explanation and excuse.

It is strange that people can be so badly misled. Wherever wild beasts roam, wherever birds fly, wherever insects drone their ceaseless hum, wherever fishes swim or worms crawl, Nature's supreme lesson is written and profusely illustrated. This lesson is that peace, even the ever-enduring peace of Nature, can and does exist for all creation; for all save Nature's only rebel—Man. Nor let it be supposed that any peculiar status of mankind necessitates and justifies his rebellion. He may plead that he has racial barriers, complicated territorial problems, economic urgencies and tremendous competitions. All these are also common to Nature, and have been through the ages. Has Man by nature a bent and adaptation for strife and conflict? Yes, and so has the lion, the mouse, the trout and the wasp. But there are strifes *and* strifes.

"Every member of the wild herd or flock is a self-appointed sentinel."

Man is chiefly set apart from all other contending animate forms by his sheer covetousness; the irresistible desire for that which is his neighbor's; the self-delusion of "brighter flowers, greener grass, on the other side of the fence". In Nature there is strife, to be sure, conflict, antagonism, and battles as fierce in their way as any known to Man. Yet each contestant seeks only that which Nature intended it to have. The struggle is universal and more earnest than any known to Man. Yet so scrupulously do all in Nature's world abide by the rules that the total result is a peace that prevails and dominates Nature. It pervades the haunts of beast and bird with the familiar tranquility of wood and field. It is a peace that, indeed, "passeth all understanding" of war-minded Man. In a word, war is essentially a human invention. Not only do its champions refuse comparison with Nature, but Man's warfare and the vigilance and struggle of Nature are distinct contrasts.

Our warfare demands the sacrifice of our best individuals—the young, the brave, the hardy. It implies planned wholesale slaughter and suffering; intentional and needless cruelty. Cruelty, in fact, is an attribute

possible of attainment only by a reasoning organism. Warfare seeks victory regardless of cost to the conquered. It is essentially selfish. The peace that ensues is incidental to victory, and the completeness of victory is measured by the extent of freedom with which the victor can dictate his terms. On the other hand, in the struggle for survival and well-being that is Nature's answer to war, it is chiefly the unfit that are slain or otherwise eliminated, and this mercifully. Costs and benefits are shared by all concerned. When a victor overcharges or overplays his hand, he is the eventual loser, by the same token. Each party seeks only that to which it has a right. Victory for one must benefit all concerned. Thus Nature's peace is far more than a by-product of the contest; it is a consequence, veritably a characteristic of the struggle. No victor can dictate his terms. The terms of peace are already prescribed in the condition of the vanquished. If weasels, for example, were to kill too many of the mice and rifle too many of the nests within their range, it is obvious they would then suffer an inevitable famine. "Live and let live" is literally and insistently the law of Nature. On the lips of war-making man, these words are a mockery.

"Nature's weeding-out processes benefit all the species concerned."

And then, with all our flaunting of this fundamental law of Nature, our wise men and philosophers, our poets and bootblacks, know that no one can disobey the laws of Nature and escape the cost. Victory in aggressive war may bring an illusion called peace. But the eventual price of war is war.

The selfishness, covetousness and greed of the aggressors in war manifest themselves in what we call "animosity". How typically human, that libel on the animals! When the lion strikes down the zebra, when the eagle swoops on the mountain lamb, when the pike seizes the mullet, it is with no malice, with no intent to give pain or cause misery even to the individual directly attacked, much less to his tribe. The other day I saw a sharp-shinned hawk pursue, capture, bundle up in his talons, and carry off a sparrow. It was an episode altogether typical of the millions that occur every day in Nature. It was obvious that to the hawk the sparrow meant merely a morsel of food to satisfy hunger. As for the sparrow, Nature mercifully administered a quick-acting panic that probably froze the nerve centers to numbness. I have seen much evidence that this is so. And yet the phrase goes—"Nature red in tooth and claw"!

The cruelty of Nature has been vastly exaggerated; too often imagined. I have seen closely too many of Nature's tragedies to be overawed by the hue and cry of cruelty. When a brood of young birds is left parentless to starve in their nest, there appears to be simply a reversal of the development process, quite as free from suffering as was the growth of the brood.

Nature's weeding-out processes benefit all the species concerned. And these processes are the most humane possible. Our own laggard race is at last taking its first awkward, hesitant steps, called genetics, on the road Nature blazed when life dawned on earth. Of course it is not suggested that we copy totally the techniques of Nature. No one but a fanatic, or a Nazi, would advise elimination of individuals who by any chance are somewhat below the highest possible standard of physical fitness. After all, we are not ready to scrap our own definition of Man—"A free *moral* agent". Yet, ironically enough, we must look to the "lower animals", to whom the physical is all-important, for a generally higher standard than our own in actual death-dealing combat.

In Nature, there is no prototype of Hitler, Mussolini, Yamamoto, nor a counterpart of their treachery in Norway, Ethiopia or Pearl Harbor. Nature knows no fifth column. Every member of the wild herd or flock is a self-appointed sentinel, ready to warn of danger; a sentinel that cannot be "reached". On Nature's world-wide battleground the god Mars would feel strangely out of place. For in this struggle the means of offense and defense grow from the same stem; they are apportioned by One who cares not at all who wins for the time being, but only that none shall be favored. When Nature fashions a spear she gives its intended victim a shield. The big cats have terrible claws, and a short effective range. The armadillo pays for his coat of mail in speed and mobility. And so it goes. None may have too great an advantage either for offense or defense, lest his destructive power, his procreative ability or his immunity from checks drive him to gain at the

serious expense of another. There is provided a fort for every siege; a defense for every attack. All at a fair price; all profiting; no one profiteering. When Nature fashions a particular weapon of offense its legitimate use and limitations are always implicit either in its own design or in the makeup of its possessor.

Nor let it be supposed that human inventiveness is alone responsible for the tools of war; that, having guns, it is necessary that we turn them on our fellow men. Mustard gas is an adaptation of the ancient art of the skunk, the mink and the weasel. Man's ingenuity is unique only in the ability to turn this purely defensive method into an abomination of destruction and suffering. The "smoke screen", by virtue of which the cuttlefish moves peaceably out of harm's way, gave man another idea that he twisted to purposes of offensive war. Nature had known such principles for ages, employing them under strict limitations for the general good. It remained for Man to adopt them, then to distort them to destructive war. The snake is held to be symbolic of guile and evil; the personification of treachery and deceit. But give credit for the warning hiss of the adder, the death-predicting rattle of the diamond-back, the expanded hood of the cobra. Consider these and you will realize that "snake in the grass" is sheer flattery for Hitler and his ilk. What a contrast is Nature's way!

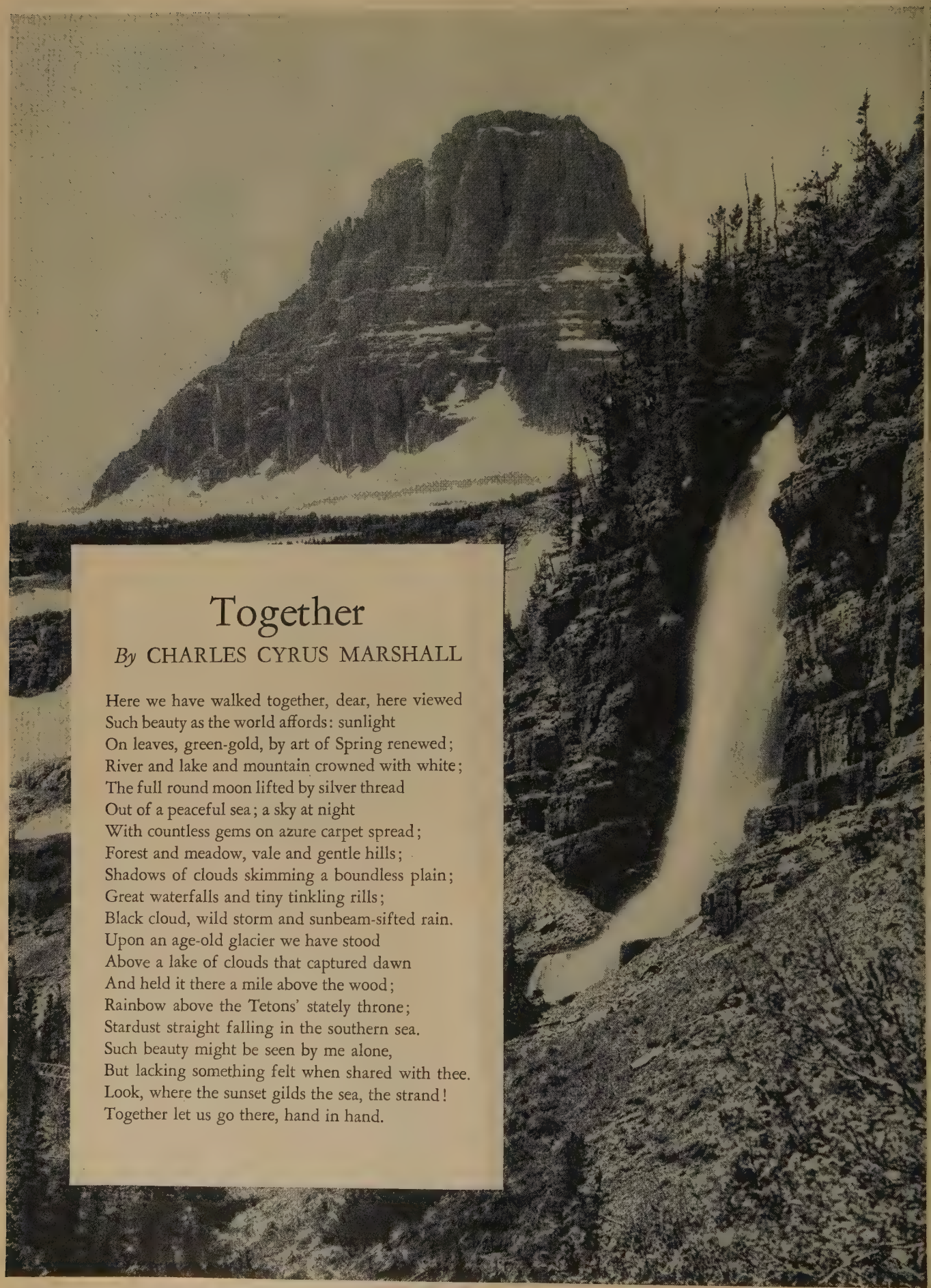
"The big cats have terrible claws, and a short effective range."

We speak all too loosely of Nature's "predators" and their "prey". There is no such fixity as that. The prey is usually the victim of his own carelessness or individual unfitness, while the predator may become at any unguarded moment a prey to some other creature, or fail through carelessness or unfitness on his own part. In fact, Nature not infrequently matches aggressor and prospective victim so closely and fairly that both survive an encounter when the one attacked is up to the best standards of its kind. I saw an instance of this when a mink attacked a marmot and, again, when a weasel sought to make a meal of a ground squirrel.

Or perhaps the elements may seem to be unduly cruel. If human warfare were as mercifully conducted as Nature conducts her storms and cold waves, we should certainly have to find a milder synonym for war than the one made justly famous by Sherman. Still one does hear of cold and hunger "making war" on wildlife. One winter, when Lake Michigan was completely frozen over for the first time in a long period of years, I picked up old-squaw ducks from the thousands of ducks and gulls too feeble through starvation and exposure to rise from the ice. In vain I offered these birds food and shelter. They seemed content to drowse away their remaining days in a state of profound peace. I think I know something of that peaceful stupor. I myself was one time on the verge of freezing to death. A delectable drowsiness and strange warmth came over me and moved me to lie down in the snow. Then a last-minute flash of consciousness told me that this was a warning. I rose and goaded myself on through the terrible night to shelter. It would have been far easier and physically more agreeable to have slept away my life in that bed of snow, which seemed as comfortable and warm as swan's down. In truth, viewing Nature's major operations, we have paid too much attention to the surgeons, too little to the anesthetists.

If we will heed the truth, whatever else, if anything, may be urged in justification of war, at least it can not be upheld by an appeal to Nature. "Eternal vigilance" is indeed the price of life to the wild. But how much more preferable, as well as more exciting, than to "stagnate in the weeds of sloth". Man, too, must be eternally vigilant. And how vastly better is vigilance than war! If peace among nations is ever to become universal and enduring, the methods by which it is won and those by which it is maintained must be the same. This is the lesson Nature teaches.

In the world of Nature hatred and jealousies do not persist and thus doom the generations that follow to certain war and bloodshed. Man's history of warfare is replete with deep-seated animosities that do not exist among the children of the wild. These are some of the many lessons that Nature teaches, not only about warfare but about daily living, one with another. In times like these we may turn to Nature for both comfort and inspiration. Too often we fail to appreciate the value of the ideals that she provides for us.



Together

By CHARLES CYRUS MARSHALL

Here we have walked together, dear, here viewed
Such beauty as the world affords: sunlight
On leaves, green-gold, by art of Spring renewed;
River and lake and mountain crowned with white;
The full round moon lifted by silver thread
Out of a peaceful sea; a sky at night
With countless gems on azure carpet spread;
Forest and meadow, vale and gentle hills;
Shadows of clouds skimming a boundless plain;
Great waterfalls and tiny tinkling rills;
Black cloud, wild storm and sunbeam-sifted rain.
Upon an age-old glacier we have stood
Above a lake of clouds that captured dawn
And held it there a mile above the wood;
Rainbow above the Tetons' stately throne;
Stardust straight falling in the southern sea.
Such beauty might be seen by me alone,
But lacking something felt when shared with thee.
Look, where the sunset gilds the sea, the strand!
Together let us go there, hand in hand.

Stranger, indeed, than fiction is the story of the loyalty of Dotty–

A Deer that Pays A Debt

By ERWIN HEIN

THIS is the story of Dotty, the deer who pays her debts. It shows that when one showers tenderness upon a forlorn creature of the forest, saving its very life in the process, one may risk a lifetime of affection in return.

The Samaritan hereof is Mrs. Clifford R. Lynn. She nursed an injured fawn back to health eight years ago. Unwittingly she became foster-mother to several succeeding generations of deer. For her grateful patient—the doe she named Dotty—now comes from the wilderness every spring with a new family to be raised.

Bridging the gap between forest and fireside, Dotty is the paradoxical heroine of a tale you may hear in southern California's San Bernardino Mountains. She winters in the wilds, seemingly content with primeval laws and hazards. But each spring, laden with new progeny, she braves the perils of civilization, again to amaze her human neighbors by summering in their midst.

Once they have heard this astounding story, people are ready to believe that Dotty tries a deer's utmost to adopt human behavior. They can, in fact, see her riding primly in the Lynn family automobile. She trails Mrs. Lynn at the daily chores. She "shakes hands" and rears on two legs to beg morsels. In countless ways Dotty demonstrates devotion to the kindly housewife who saved her life and then helped her meet the exacting details of motherhood.

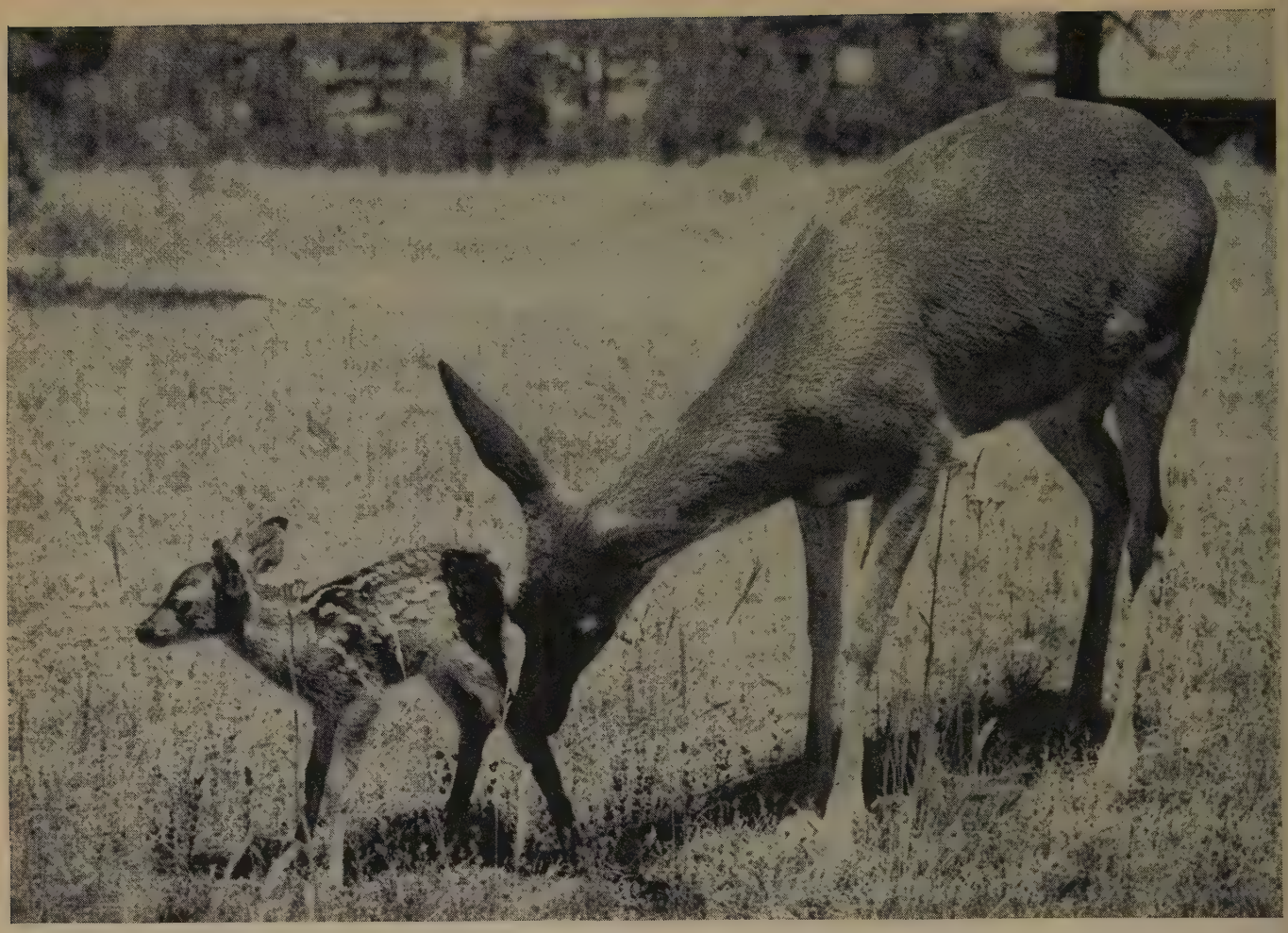
It was the night of May 16, 1935, that Dotty was brought to Mrs. Lynn. She was a pathetic little seven-pound fawn, barely one week old and much more dead than alive. She had grievous injuries that an automobile had inflicted. A motoring physician had found the tiny animal floundering at the edge of a mountain road.

"I washed her wounds," says Mrs. Lynn, "and made a warm bed for her in a clothes basket. Night and day for six weeks I fanned the spark of life. Every other hour in all that time I fed her from a bottle. Finally it was apparent that she would live, and she left my cabin for the first time.

"Exhausted from my efforts to keep Dotty alive, I quite naturally was fond of the little waif, but I wouldn't have discouraged her return to the forest. Never, in fact, was she restrained, except as she needed protection. She could have wandered away at any time, but she chose to stay for two and a half years. We were inseparable pals.

"It was the mating call that finally persuaded her—and she tried to take me with her. That was in November of 1937. She had hardly known the forest since the day of her near annihilation, but at last it intrigued her. She gazed into the shadows amongst the trees, nudged me with her nose, and gazed some more. She ventured away a few steps at a time. At each halt she looked back to me. Accepting several of these hints to follow, I walked with her a mile or so. Ultimately she gained confidence enough to leave me. That, I thought, was my final walk with Dotty.

Dotty, her foster-mother and one of Dotty's own fawns that she comes back each year to give birth to in Mrs. Lynn's barn.



Dotty and one of her offspring, named Bambi by Mrs. Lynn, who nursed the mother deer back to life and who has been repaid each year by the loyal return of her protege on the same date.

"Throughout the winter of 1937 there was no further sign of my recent guest. On May 6, however, she bounded home from the wilderness. Wending her way back to our camp had involved some dodging of automobiles on the roads she must have crossed, but here she was—an expectant mother! I contrived to fashion a maternity ward in the stable, and there she bedded down. This, my first experience as midwife to a deer, resulted happily in the delivery of a daughter.

"Dotty and her offspring remained through the summer. When Dotty again sensed the call of the wild, her daughter went along. There were the same eager gestures from Dotty. I, too, was expected to go. Just as before, the doe reluctantly but inevitably edged away from the comparative comforts of civilization."

In the next spring Mrs. Lynn might not have been surprised to see Dotty return, except for the timetable precision thereof. It was May 6—the same date of her 1938 advent—that she minced her way into the clearing again. This time Dotty had twins, a buck and a doe, as she has accomplished each spring since. And not once has she missed her homecoming on May 6.

"It may be mere coincidence, this matter of her arriving the same day each year, or it may be evidence of a natural law that is beyond my ken. I don't pretend to explain it," admits Mrs. Lynn.

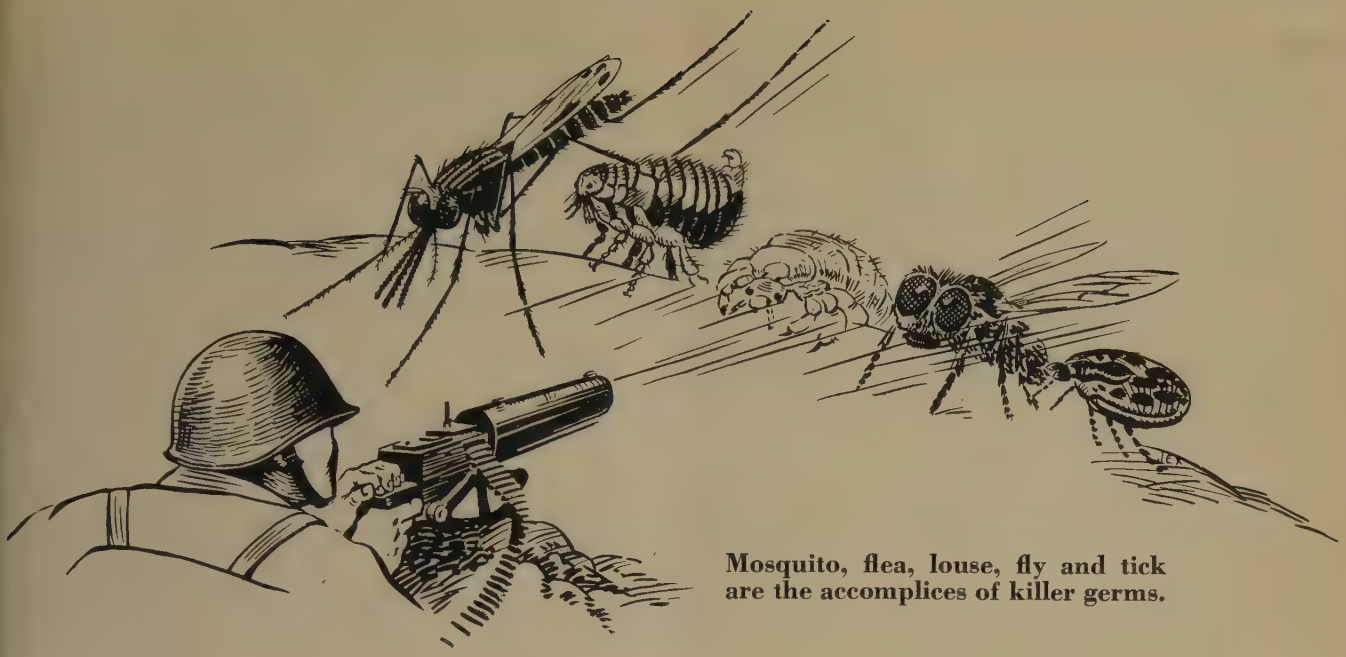
Some of Dotty's youngsters have come back to Mrs. Lynn, but they are not methodical about it. Some haunt the premises at night, merely snooping for food in the friendly atmosphere of their birthplace, but they are gone with the dawn. Sooner or later they cease to return.

"I have had two more little accident victims brought to me since Dotty," says Mrs. Lynn. "People hereabouts know that I can't ignore the whimpering of a fawn.

"It is not easy to instill new life in a fawn that has been badly injured. The frail creatures are subject to all sorts of ills. I swear I'll never try it again. Yet, I feel fully repaid for the nights and days of care.

"Each autumn, at the first sign of winter, I wonder what puzzling signals go through Dotty's brain. There is no disputing that she is the pampered child of a tamer world, for I have granted her every whim. But she finds the annual call of the wild to be irresistible.

"What is it, then, that brings her home in the spring? I am convinced that she actually regards me as her mother. Certainly I couldn't possess such appeal for Dotty, except that I have been a tender and considerate mother—the only one she can remember."



Mosquito, flea, louse, fly and tick are the accomplices of killer germs.

Science today is aiding the soldier, who, through history, has fought an unequal battle with—

Enemies Not in Uniform

By GARNET W. JEX

War costs lives. But we may today feel some consolation in the fact that, phenomenal as has been the progress in treatment of battle wounds, it has its counterpart in the prevention of fatalities from disease. Until World War 1 unseen killers took more soldiers' lives than did enemy weapons.

Throughout history armies of empire builders were beset by epidemics. Plagues, not Saracen arms, claimed most of the Crusaders. Typhus fever and the Russian winter annihilated most of Napoleon's conquering army of 550,000, which marched on Moscow in 1812. In our own war against Mexico seven American soldiers died of disease for one killed in action.

But, although today's headlines play up the buck-toothed Jap and the dehumanized German as the major enemy, the spotlight is also turned upon potential hidden killers—germs—that are sometimes the most dangerous enemies.

Mosquito, flea, louse, fly and tick are the accomplices of killer germs. Nobody loves these pests—but many people do not take them seriously. Yet they form an insidious fifth column—harboring, nurturing and transmitting to man the organisms of disease that have brought havoc to great armies and to whole populations.

The mosquito heads the list of insect enemies. And it is the female of the species that is the carrier of malaria and yellow fever, of filariasis and painful dengue fever.

Malaria was a chief contributor to the decadence of Greece, the fall of Rome, the abandonment of the English colony at Jamestown, the failure of Spanish conquests. It so weakened the enormous population of India that smaller hordes of non-malarious invaders could vanquish them. Particularly in the tropics the damage to its victims, the suffering it causes, the general debility of whole populations, make it the greatest health problem in the world today.

The *Anopheles* genus of mosquitoes transmits malaria. Mr. Anopheles is only an ornamental dandy with gorgeous plumelike antennae. Like Ferdinand the Bull, human gore does not interest him at all; he prefers to feed on flowers and pollen. But temperamental, small, even timid, Madame Anopheles is a voracious vampire. I have seen, in photographing them, previously chilled and starved female *Anopheles quadrimaculatus*, the malaria mosquito of the southeastern United States, pounce upon a man's exposed arm and gorge. Her slender, brown segmented abdomen distends enormously, becomes rich red in color as she fills with blood. Her characteristic anopheline posture changes to an even greater angle, "standing on her head". Her long hind legs, which generally kick high in the air, come down to the victim's skin. Pushing hard she bores with her

marvelous beak mechanism to an almost incredible depth, its covering sheath now retracted. It takes about two seconds to enter a man's skin, longer to go through a tough animal's hide. In from 30 to 90 seconds she is ready to take off on a drunken flight.

In two or three days she will need another meal. If the person on whom Madame Anopheles has feasted had malaria, she has sucked up with his blood some organisms known as gametocytes. Within her body an involved cycle of development changes, in about two weeks, the round gametocytes into an enormous number of spindle-shaped sporozoites. Madame will inject these into the blood stream of a healthy victim, presenting him with malaria, and so on and on.

Different species of anopheline mosquitoes transmit malaria in different parts of the world—sometimes one, sometimes several, in a region. Their breeding places and habits differ; often are obscure. Scientists generally agree that the best way to destroy this insect is to prevent its raising families. Sanitary engineers dry up the water of breeding places, oil the surface or dust with Paris Green to poison wrigglers, and introduce natural enemies like the top minnow to eat them. Sprays kill the adults and screens keep them out of houses.

Quinine comes nearest to being a real specific for malaria, supplemented by plasmochin and atabrin. No single drug has been found that kills all forms and stages of the parasite promptly and completely. But proper treatment does bring cure.

Sanitation is more important than ever now, for when the Japanese occupied the Dutch East Indies early in 1942 they cut off more than 90 percent of the world's quinine. The Army needs most of America's reserve of quinine. Civilians must depend on improved synthetic plasmochin and atabrin, both of German origin. With drugs, shovels, improved pyrethrum sprays, anti-mosquito ointments and mosquito bars, our soldiers have dared the dread anophelines in the Southwest Pacific jungles. Though malaria is not licked, we control it better there than could the boys on Bataan whose surrender was hastened by lack of these things. Today, when Jap prisoners are taken, many of them, in spite of the Java conquest, are desperately ill with malaria.

Beautiful silver and dark brown *Aëdes aegypti*, with lyre-shaped pattern on her back, plays the villain's rôle in the transmission of yellow fever. Originating in Africa, the source of so many diseases, for five centuries yellow fever has ridden the ships of many nations to warm and temperate lands on both sides of the Atlantic. It frustrated all of Spain's attempts to dominate the New World. In panic people fled from ports and coastal areas, when terrifying epidemics raged. The French would have succeeded in their Panama Canal venture had it not been for yellow fever, plus malaria.

The Spanish American war took able, modest Walter Reed and his courageous colleagues to Cuba. Following up the leads of Carlos Finlay of Cuba and Henry R. Carter of the U. S. Public Health Service, they fastened the guilt upon *Aëdes aegypti*. With new knowledge, Gorgas, Carter and their associates cleaned up the Canal Zone. Since 1905 there has not been a single case of yellow fever in the continental United States.

Caused by a filterable virus, "Yellow Jack" kills about one-fourth of its victims. Fortunately those who survive are immune. Control is relatively easy because

This picture of Napoleon's Army in bivouac near Dorogobush during the Russian campaign shows suffering from cold, but the troops were equally harassed by epidemics of typhus. Millions died of insect-borne disease in olden days, and the picture below, from a contemporary copper engraving, shows a plague hospital in Vienna in 1679 during the time the city was under siege by the Turks. Pictures from the Bettman Archive.

Aëdes breeds in man-made containers near houses rather than in swamps and streams.

Until a few years ago we could brag that yellow fever was on the way out. Now we are not so sure. In spite of Latin America's notable progress, another form of the disease, "jungle fever", has been found. There may be other carriers besides *Aëdes;* some animals besides man may be susceptible. In 1940 there was an outbreak of yellow fever in the Sudan. Rommel's men in North Africa were reported to be suffering from it. In World War 1 it flared up in Egypt and the Middle East, as well as in the Congo and West Africa, where it is endemic. War shipping and the airplane traffic link these regions with South America and the United States. *Aëdes aegypti* still breed freely in the southeastern United States, and would relish any chance to feed upon a newly-arrived yellow fever pa-

tient, starting another murderous cycle of disaster.

But thanks to the untiring efforts of the Rockefeller Foundation, an effective vaccine has been developed. In its laboratory at Hamilton, Montana, the U. S. Public Health Service is making great quantities of it to inject into the oft-punctured arms of American soldiers who may be exposed to the disease in various theaters of war. Brazil and other nations are vaccinating large numbers of their people. We sent it to the British in Sudan.

A particularly interesting phase of its control is the airplane quarantine established at southern U. S. ports where arriving planes and their cargoes are vigorously sprayed by Public Health Service personnel. The temperature of all passengers is taken, any with a trace of fever detained, and a six-day record kept of all those from infected areas.

Dengue, or break-bone fever, is also spread by *Aëdes aegypti* in our southern states, where local epidemics occur. Suffering is extreme for a few days, but death rarely follows. Here, also, prevention depends upon destroying breeding places, and screening.

Filariasis, often called elephantiasis, is another mosquito-borne disease common in the tropics. Fortunately it is not painful and it develops slowly. But no cure has been found and progress cannot be arrested except by removal to a temperate climate.

The flea that rides the rat spreads bubonic plague —the Black Death—history's greatest killer. Many times this disease has become pandemic, spreading over all the inhabited world. Today only in the Orient, and to a limited extent in our West, it is endemic—or present all the time.

There is a vast literature on the plague. Boccaccio describes it in the introduction to the *Decameron*. His contemporary, Petrarch, in one of his famous letters, wails, "Oh happy posterity, who will not experience such abysmal woe and look upon our testimony as fable". Defoe tells of the Great Plague of London in 1665; Samuel Pepys records in his diary, "I did see . . . houses marked with a red cross upon the doors, and 'Lord have mercy upon us' writ there".

The physician and chaplain Guy de Chauliac, who knew the epidemics of 1348 and 1360, explained, "the grand conjunction of the three superior planets, Saturn, Jupiter and Mars, in the sign of Aquarius, produced the Black Death". Not until the 1890's was there a physician who really knew that plagues were caused, not by the grand conjunction of planets, but by the more sinister conjunction of rats, fleas and the plague bacillus.

Yet a few thinking men for centuries had vaguely connected rats with plague. They suspected that it voyaged from the East in ships. In the 14th Century Adriatic cities forbade passengers, crew or cargo to land for a period of thirty, later forty, days—a "quarantina", until port authorities were satisfied no disease was aboard. So began our modern quarantine system.

In 1894, with a flare-up in Hongkong, which soon spanned the Pacific, investigators, now armed with the microscope and the new science of bacteriology, isolated the plague bacillus. By 1907 the connection between flea, rat, and the disease in man, was established. With this knowledge control became possible. Vaccines today give a degree of immunity for limited periods of time.

When a plague-sick rat dies, the infected fleas that lived upon him leap at the first chance upon another rat, other animal, or a man. Real control lies in exterminating the rat by cleaning up debris where he lives and feeds; ratproofing ships, building him out of all structures, destroying him with poison and trap. We fumigate to kill both rat and flea. Vigilantly on guard against the introduction of plague from abroad, we are warned, by occasional minor outbreaks in our ports, never to relax.

The flea and the rat collaborate again to spread another disease, the milder endemic form of typhus fever, in this country found in summer and fall chiefly in the southeastern states. Fortunately the death rate is very low, about two percent.

The common body louse transmits from man to man the very deadly European typhus fever, whose virus evolved probably from the older rat-flea typhus. An infected louse always dies, but we shed no tears at the passing of this bosom pal.

It has been said that the history of typhus fever belongs to the dark ages. May this war not produce a dark age of typhus!

Between 1917 and 1921 there were probably twenty-

The airplane links continents and guard must be kept lest the nucleus of an epidemic be inadvertently brought into the country. Here U. S. Public Health Service doctors check air travelers for possible illness. Photograph from the United States Public Health Service.

five million cases in Soviet territories, with two and a half to three million deaths, not to speak of its toll in Poland, the Balkans and the Near East. Today we hear reports that Hitler's eastern armies, in spite of modern sanitation, are menaced by the same insidious enemy that helped complete the disaster of Napoleon.

Typhus has been a violent disease from the start, but present limited evidence shows that a vaccine produced by the Public Health Service and our pharmaceutical firms eases typhus attacks and prevents death. Shots with it are routine in the army today. However, personal sanitation is the real answer. Fortunately the American soldier is not afraid of soap and water. He shaves, he cuts his hair close. Behind the battle-front we expect our services of supply to keep him and his quarters clean and put him through a delousing plant, when and if he begins to scratch. To be thrown into guard-house, or jail, is no longer a sentence to death.

Diseases of filth, crowding and low economic standard are dysentery, cholera, typhoid fever and others. They are transmitted in many lands partly by flies, especially the common house fly. With shiny wings he can bring in germs on his feet from somewhere over on the wrong side of the railroad tracks.

Ticks and mites of many kinds live on other creatures all over the world. Once we thought them just annoying. Now we know that many spread organisms of death. The wood tick transmits by bite, or by its body material, most seriously Rocky Mountain spotted fever, in our Western and Eastern states. Keeping out of tick-infested brush, and careful "tick hunts" over one's person are the best precautions. For spotted fever, the Public Health Service has successfully developed a serum which saves lives.

War always brings a peak in the death rate curves of most diseases. They will rise again, no doubt. But this we know: curves must start from history's lowest levels. Thanks to modern sanitation and medical knowledge, and our economic standard, we may hope that America's curves will not climb the heights. We have kept epidemic foreign diseases from our shores and cleaned them up within our boundaries so that a single case, which unlawfully slipped through our quarantine system on a German vessel a few years ago, created a scandal and a mild panic until it was certain the disease would not spread to others.

We are free of the abysmal woe of Petrarch's day and his grim testimony does seem as strange as fable. The bacteria killers are with us yet, but we can turn the spotlight of knowledge on most of them. Our F. B. I. of science fights at home and on battle front.

Singing through hardship and tragedy, the indomitable blue-gray gnatcatchers seemed—

Sprites of the White Oak

Illustrated by R. Bruce Horsfall

By LULU MAY ALER

TSIN-NG! *Tsin-ng! Tsin-ng!* Tiny, high-pitched, vibrating notes like the plucking of a fairy's banjo directed me to our first pair of blue-gray gnatcatchers. Lithe, diminutive, sky-gray and white, flashing long, black, white-edged tails, they raced back and forth overhead, adding plant down, birch bark and lichen to the rising round wall of their miniature home. When she lingeringly molded the interior with supple body, and reached daintily over to bind outer trimmings, he flitted commenting nearby. When he came to the rim, she darted out, he in close pursuit. In a twinkle, they returned to work.

Securely web-bound to the fork of a white oak branch a yard from its tip, the nest seemed budded and aged there. Swaying seventeen feet above a grassy slope, it looked down through lacy treetops to a reed-bordered lake. Back of it, across a narrow ridge, massed crowns of oak, birch and tamarack hid an insect-laden peat bog.

"Like furies incarnate, the wee figures hurled themselves at the huge creature . . ."

Having satisfied their feverish urge to build, the birds indulged in a few light-hearted days of flitting warblerlike through the encircling oaks. Occasionally one visited the home to test its comfort, molded briskly, bettered the rim, and then nestled low a contented second before speeding back to play.

Crashing in on this happy Arcadia, came a terrific daybreak storm, lashing the whole region. The instant the fury subsided, I rushed to the ridge past uprooted tamaracks, torn oaks, and beheaded elms. As, at last, I neared the top, *Tsin-ng! Tsin-ng!* told me the sprites still lived! Their home-tree had lost only one small branch, and their nest appeared unharmed. But they would hie to the rim, inspect, dash away again without entering. Was the home too saturated for occupancy—or too cluttered with debris?

Between inspections, they quietly preened their disheveled attire. Suddenly there was a whizz through the branches! They were chasing an intruding cowbird. Twice this happened. Yet they only fidgeted when a Baltimore oriole and a crested flycatcher came visiting. Did they know the cowbird's parasitic habits? Was a cowbird's egg even now in the nest?

Toward noon a gnatcatcher finally entered the home, fluttered gingerly, pecked at the rim, and left. Shortly the procedure was repeated, but with such scuffling as to have scrambled an egg. Then followed darts after bits of trimming and much attention to the outer rim.

Soon more zealous attention to territorial claims encroached on play; not only cowbirds but orioles were now ordered out. Defense of their domain included not only the home-tree but the whole circle of oaks around it.

Then a new era began. Playtime was over, and the responsibilities of coming parenthood were all-absorbing. These they shared with remarkable impartiality and devotion, alternating so closely on the nest that I rarely saw it uncovered more than a minute or two. The powerful urge to carry the nesting to fruition dominated both.

It impelled protective methods of changing shift and adaptation to variable weather. On warm days, the

"When she lingeringly molded the interior with supple body, and reached daintily over to bind outer trimmings, he flitted commenting nearby."

off-duty bird, after foraging discreetly outside the circle but within a hundred-yard radius, re-entered the home-tree far from the nest and sped to the dense foliage around the trunk. Instantly the on-duty mate slipped in there too; almost hidden, they chatted and flitted a moment before the returned one stole to the nest and the other streaked away.

But through cold spells, they omitted this delightful tryst. Their routine then simulated the passage of one bird through the tree. Just as the forager reached the rim by an upward zigzag from the lower branches, the at-home mate flitted out and away through the upper branches. So cleverly did they conceal the purpose of trips to and from the tree that casual onlookers saw only a rover meandering through instead of a home-pair keeping precious eggs warm.

When rain poured, they omitted not only the tryst but change of shift. Once at a slackening I saw him eagerly relieve her. A torrential shower gave him a half-hour shift before another lull and change. Then a deluging downpour stretched her turn to an hour. Meanwhile he sang from tree to tree around the circle, or alighted below her to look up and converse, rain pouring off his tail all the while.

Just ten days after our first devastating gale, another hit us, adding jagged hailstones and thunderbolts to driving rain. Nearing the home next morning, I found a towering cottonwood scarcely a dozen rods away lightning-gouged from tip to base. Great splinters, hurled several hundred feet, protruded from the ground like huge javelins. Havoc all around!

Yet a jubilant chorus greeted me. Most gladdening of all, through the deep fluting of a wood thrush below him, came our gnatcatcher's light *Tsin-ng!* And across the wreckage of an intervening oak, his mate, on their nest, gazed tranquilly toward him.

Never was father's song in happier vein—a tremulous humming to himself as he breakfasted through the foliage, a rapturous abandon as he rushed to keep tryst with mother, a murmuring soliloquy from the nest, and, perhaps, as he bounded off, a racing through all his gay repertoire—naive little songs evolved from his call-note, with sometimes a whimsical *Tseek!* or *Squee!* substituted for a *Tsin-ng!* Then I made a startling discovery! He not only sang his call-note themes from the nest, but he *warbled* from the nest—warbled long soft phrases inaudible except for an occasional fine note. Crown feathers erected, throat pulsing, he tossed his head and delivered whole arias. Yet, even from just under the nest, I could rarely hear him.

Thirteen days of continuous sitting went by. The fourteenth morning found the couple snuggled close together in a near-by tree, fluttering and billing ecstatically. Presently one took food to the rim, softened it in the bill, then bent into the nest repeatedly. All day long the excited pair fluttered to and from the home, feeding and tending their young. Often, together on the rim, they gazed in, rapt—as if they could scarcely believe the miracle.

Their division of labor, heretofore on a shift-for-shift time basis, now developed along more nearly functional lines. Although each at times performed the duties of the other, mother became predominantly homemaker—feeding, cleaning, and brooding—while father became chief protector and provider. He still took a turn at the nursery while she went out for her meals, but, instead of brooding, he gathered food

". . . a plump little bob-tailed image of the parents fluttered down to a twig below the nest and set about dressing his immaculate plumage."

nearby for the babies till she dashed back, usually bringing them a gift. Then he rushed supplies for her to serve before she brooded again. When brooding was unnecessary, both birds brought and served the meals.

With increasing frequency, father's role of protector upset the feeding schedule. Most of the neighbors now had their young on the wing and came foraging through in hordes. Added to these was a big gray squirrel. To all appearances, it came to breakfast innocently on acorns. But the wee parents instantly bristled with suspicion. Mother rushed to cover her brood while father zipped and swished through the foliage, chasing the intruder from branch to branch. He finally stung it down the trunk and away. Both then hastened the delayed breakfast for their offspring; caught moth millers, beat them against a branch, and tore off the wings before taking them home. There were eighteen trips to the nest in eighteen minutes!

Before next day's breakfast, it took both parents to rout the now stubborn squirrel. Gaping mouths above the nest rim, that fifth day after hatching, revealed triplets.

The following morning, efforts to dislodge the squirrel reached a crisis. Like furies incarnate, the wee figures hurled themselves at the huge creature, crying *Tsin-ng!* in the most piteous, heartbreaking plaints. The squirrel cringed under the piercing darts, but snarled as it cringed. A thundershower intervened, and later, I found the scene reassuringly peaceful—mother brooding, father bringing moths, no squirrel.

But next morning, I found it strangely still—no *Tsin-ngs,* no notes of any kind. No little parents near. I waited tensely. At last I heard father in his favorite foraging tree. Empty-billed, deliberate, he zigzagged his usual route to the nest, calling each step of the way; looked in; meandered on to the next tree.

While he still dallied and called there, the squirrel scampered up the home-tree and feasted on the nest-branch, where it had never been allowed before. Soon a second squirrel joined the first. Close inspection revealed a hole near the nest's rim, such as a clutching claw could have made. Below, the lawn was strewn with fresh twigs dropped by nibbling teeth.

Father wandered away. Several times I heard him calling a little beyond his usual foraging range—alone. Had mother given her life in futile defense of her young? Apparently, for her mate left that day.

Complementing my study of this ill-fated family from June 4 to 30, 1939, I last summer enjoyed thrilling new phases of the gnatcatcher nesting cycle. On June 3, 1942, trailing a once-familiar *Tsin-ng!* from tree to tree, I located its owner just as he and his mate put a redwing to flight, thereby revealing their secret. Three days later I found him taking food to the nest! They must have built in mid-May and safely carried incubation through a most destructive seven-inch deluge and gale.

The foraging father was either not my little tenor of '39, or his voice had deepened and acquired a suitable new repertoire. Instead of the lilting themes fine-strung from ethereal call-notes, I now heard bouncing staccato phrases of rollicking, clacker-like chirrups. But the day his twins began wing exercises on the rim, his serenading abruptly ceased. He was often absent and uttered only quick *tsing's* when he brought food.

Puzzled, I followed him. About ten rods up the hill, he burst into the most won- (Continued on page 332)

This is one of the articles about soldiers and Nature promised last month. It is written by a soldier-naturalist who is a sergeant in one of our armored regiments; "Doc" to the boys in the outfit.

★

"Bud, Bob and I were taking it easy on a thick bed of dried cedar needles."

Nick, the company cook, feared snakes, but got to be "that way" about—

Blackout

Illustrated by Lawrence D. Conway

By JUSTIN DENZEL

THE noon chow period of troops in the field is probably the pleasantest hour of the day. Then friends gather with friends, linger over their coffee, have a smoke, and discuss the vagaries of army life.

Mess that day had been good and the portions generous—meat loaf, potatoes, peas, thick slices of bread with plenty of butter. Bud, Bob and I were taking it easy on a thick bed of dried cedar needles. Others were gathered in small groups around the mess truck. Nick, the cook, picked his way among them, arms piled high with loaves of bread. Nevertheless, he stopped at our group to ask me his usual question.

"What came first, Doc, the chicken or the egg?"

"The egg," I recited, "because chickens are an offspring from a primitive type of reptile. The early reptiles were egg-layers. Therefore, the first creature that could be called a chicken must have come from an egg."

This answer always delighted Nick. He felt, I suppose, that it proved that a naturalist could not answer a question without becoming involved.

"Y'always get out of it by beatin' around the tree of life," he chuckled, starting off with his load.

The words had hardly left his lips when he gave something between a grunt and a scream. Bread flew in all directions as Nick leaped across the clearing. Turning, breathless with fright, he pointed a trembling finger toward the high grass.

"There's a snake in there. Big as your arm."

If someone had shouted "air raid", the men could not have dispersed more rapidly. Mess kits were kicked over; coffee cups clattered to the ground; soldiers made a wild scramble to safety. Bud, having no fear of the critters, made a dash for the grass clump. I circled to cut off the snake's retreat. As I did so, I caught a glimpse of its head and a part of its blue-black body.

"It's coming your way," I shouted.

"Is it poisonous?" asked Bud, taking off his cap and jamming it over his right hand.

Almost at the moment I answered "No", Bud made a flying tackle that did justice to his football days at Northeast High. I heard a muffled grunt as he hit the ground, and saw a flash of what looked like a black bull whip as the snake thrashed about in an effort to escape. Bud had the quarry somewhere about the middle of its length. He looked up and grinned.

"What down is it?" he asked.

"From the size of him I'd say you'd won the game."

We brought the snake to the center of the clearing. Somewhat reassured at seeing us unharmed, the men began drifting back to form a respectful semi-circle. The reptile was a beautiful specimen

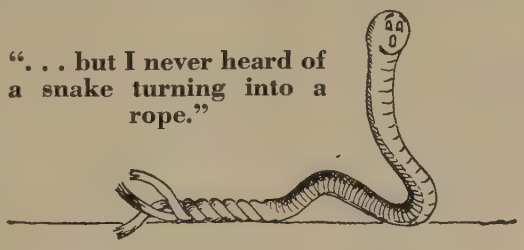
"Bread flew in all directions as Nick leaped across the clearing."

"Nor did he know that Blackout was making his clinging way up to his shoulder. When he discovered it, our cook was petrified."

of a mountain black snake, that scientists know as *Elaphe obsoleta.* There were several six-foot guesses about its length, which proved later to be five feet, four inches. It was not, as Nick had announced, as thick as your arm, yet he was not far wrong.

Ten minutes after its capture our find was perfectly docile, allowing itself to be handled without sign of fear or objection. A few of the bolder soldiers ventured to touch its glossy scales with their fingers.

Nick, however, hung in the background, still slightly shaken by the experience. He was plainly interested, but could not quite get up courage to come closer. Nor could he understand why the snake did not bite. To him all snakes were bad snakes, poisonous, attacking people on the slightest provocation, and equipped with long and dangerous fangs. Some of them, he asserted, even spit at you. He would not touch one for a thousand dollars—or so he said.



". . . but I never heard of a snake turning into a rope."

The next day we took pictures of the new addition to our fast-growing menagerie. Everyone had to be snapped holding the snake. But Nick still remained aloof, refusing to have anything to do with the black fellow. Yet, it was his discovery, and he seemed to feel a certain necessity to be on hand when it was shown off. Someone suggested that we should give our new pet a name. Dozens were proposed but did not seem to fit. Finally Nick rose to the occasion.

"Let's call him Blackout," he said.

This fitted perfectly and was quickly accepted. Nick swelled with proprietary pride. He became a bit bolder and agreed to have his picture taken *next* to someone holding Blackout. He stood stiffly, staring straight at the camera. He did not see the snake's head come slowly around and rest on his arm. Nor, while the photographer waited, did he know that Blackout was making his clinging way up to his shoulder. When he discovered it, our cook was petrified. His eyes bulged. He did not—or could not—speak, but stood rigidly.

"Nick," I said, softly, "just reach up slowly and take him from around your neck."

To my amazement Nick obeyed. Shakily he grasped the snake in the middle, drew it away and held it at arm's length before him. Then he began to laugh. It started with a giggle and broke into a deep belly laugh, the kind of a laugh that comes when you try something you have feared for years only to find your fears were silly.

In these few minutes Nick completely lost his fear of snakes. In the days that followed he spent spare moments looking after Blackout. He held him in the Tennessee sun to keep him warm. He was careful to see that he got his daily drink of water. He searched the countryside and brought back lizards and field mice. The big snake ate ravenously, and a number of times I was surprised to see him accept the morsels out of Nick's hand. It certainly seemed as though Blackout recognized and welcomed his benefactor.

One evening, since we were preparing to move out, Bud and I took the menagerie to the edge of the woods and began to release the captives. You cannot be a circus and an armored outfit at the same time. And after camping in one spot for a week or more, and with the help of half the regiment, it is not difficult to build up a sizable zoo. But each time we broke camp we turned loose all the animals, except for a few whose foster parents resisted too strenuously. The job was almost finished when I picked up the cloth bag in which we kept Blackout. It seemed rather limp so I prodded it. There was no sign of life. Hurriedly untying the cord, I hoped I would not find a dead snake. In place of Blackout was a piece of coiled rope. Baffled, I asked Bud what he knew.

"I've heard of horse hairs turning into snakes," he said, "but I never heard of a snake turning into a rope. Looks like someone wanted that snake more than we did."

"Quite right, Watson. Any idea who?" I asked him quizzically.

"You can bet your boots it wasn't your butler or my valet, but there's a certain cook who's been that way about Blackout."

"We turned loose all the animals except for a few whose foster parents resisted strenuously."

"... curled on the seat next to our culinary expert was Blackout, in perfect reptilian contentment."

The commotion of troops on the move was growing, so we hustled back to load equipment. While the column was getting into formation, I saw Nick sitting behind the wheel of his truck, waiting to take his place in line. I ran over but he did not see me approach, and was startled when I opened the truck door. So was I, for there, curled on the seat next to our culinary expert, was Blackout, in perfect reptilian contentment. Said Nick:

"What's the difference if he stays up here with me or wrapped up in an old sack in the back end of the truck? Besides he likes it here with me."

That left nothing for me to say, so I grinned and hurried away. As the column passed by I heard someone shout, "Hey, Doc, what comes first, the chicken or the egg?"

★

The Left-Handed Whelk

By HUGO H. SCHRODER

If you were walking along the shores of the Gulf of Mexico or the Atlantic Ocean, looking for sea shells, you might find a strange object made up of numerous capsules joined together by a cord at one side. A closer inspection would reveal that each flattened capsule was nearly an inch in diameter and an eighth of an inch thick, and there would be scores of these leathery capsules in a string, two or more feet in length.

At first glance, it would be difficult to associate this unusual object with sea shells, on account of its extreme length as compared with the average size of shells found in that region. That string of tough capsules, however, is the egg case of the left-handed whelk, or lightning shell, one of the common mollusks of the southern shores. In most cases, the empty shell of this marine creature will not exceed eight inches in length.

While searching over the tidal flats along the Gulf of Mexico I have found some large, live specimens of this mollusk. At low tide many marine creatures are exposed to view in the shallow water of these regions. During visits to the Sanibel Island and Captiva regions, I have found strings of these curious egg cases in the water, with one end anchored in the sandy bottom.

Some of these mollusks have been surprised at their egg laying; the string of cases being still attached when the shell and its inhabitant were picked up. Recently I discovered a gigantic specimen occupying a shell more than ten inches in length; the mollusk had a partially-completed egg case attached. There were about 125 capsules, each an inch and a half in diameter.

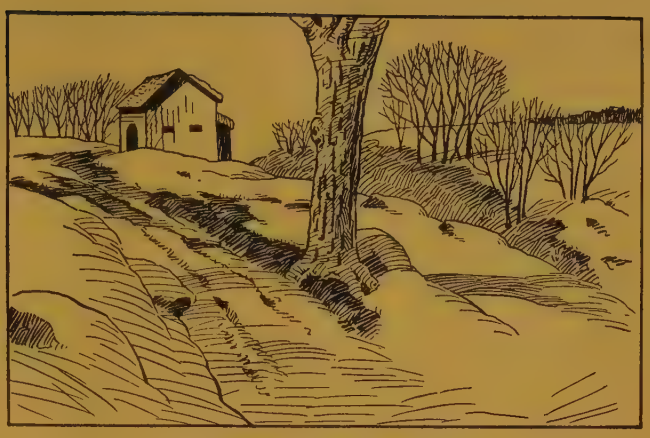
The extremely large shells of the left-handed whelk, *Busycon contrarium* (or *perversa*), bear little resemblance to the smaller shells in the matter of outer coloring; the bright markings disappear as the shell increases in size. The movements of the mollusk produce a high lustre to the interior of the shell. The photograph shows a specimen about eight inches in length, with the black mollusk partly out of the shell. This specimen was found with the egg case still attached, therefore the more than two-foot-long string of egg cases is incomplete. There are several clusters of egg cases of another mollusk attached to this string—eggs of one of the species of *Fasciolaria*. There are three clusters of egg cases of the latter visibly attached.

This is the twenty-fifth in Nature Magazine's series of educational inserts

Living Out

By E. LAURENCE PALMER

Illustrations by Garnet W. Jex



Snow banks on the north side of a road that runs east and west melt more quickly than those on the south side. Hillsides that are most directly exposed to the sun's rays are usually the first places to become bare.

MANY of us can remember the time when for a boy or girl to sleep out of doors was almost unheard of. We had read, of course, of the forest life of hunters, trappers, explorers, soldiers and Indians, but these descriptions usually came to us second-hand, as it were; almost never did they come direct from those who had experienced this method of living. Even people raised in the country seldom passed a night in the open unless for such a task as keeping a fire alight beneath a kettle of maple sap. All this in spite of the fact that living in the open was primitive man's first occupation.

About forty years ago, however, there came a change. Seton had organized his Woodcraft League at his home in Connecticut, and the Boy Scouts of America were getting into their stride. Not long afterward came the Girl Scouts and the Campfire Girls. By the early nineteen-twenties upwards of a hundred thousand boys and girls went to camp each summer, and Charles W. Eliot, President Emeritus of Harvard, termed the organized camp movement "the most important step in education that America has given to the world."

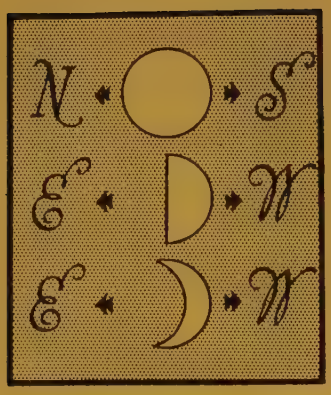
It is impossible to over-estimate the value in inspiration, self-reliance and Nature knowledge that has come to America's children through the opportunities this movement has given them. Instead of fearing the wild creatures, an almost universal attitude of the past century, and one still shared by many grown-ups, both city and country-bred, the children of today know that attacks by wild animals are almost unknown. Two years ago a five-year-old child, reared in an eastern city, was lost on the slopes of Chocorua Mountain in New Hampshire. An organized search was at once established, but, because of a remarkable series of unknown facts, she was not found until eight days later. Aside from weakness and frost-bitten feet, she was unharmed, and she soon recovered. Bears and wildcats frequented that forest, but none of them disturbed her. She drank freely from a spring-fed brook, but had nothing to eat, save a few berries. Each night she curled up in a bed of dry leaves in a hollow. Her survival can be explained only by the fact that she was not afraid. Had she given way to terror, she could scarcely have survived beyond the first night or two. Let us hope that the example of this brave and resourceful child may put courage in the hearts of those who are afraid of the woods.

There is also the recent case, which many will recall, of the boy, a few years older and a Boy Scout, who became separated from his party in the Katahdin wilderness of Maine. He competed with the bears for blueberries, the most available food, and finally found his way out to a settlement.

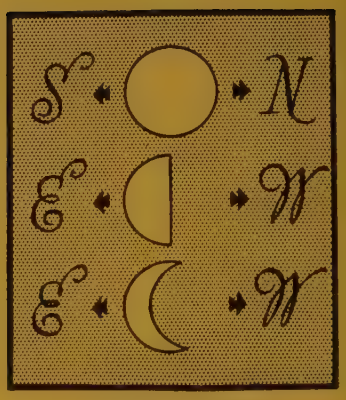
Somewhat in contrast is a wartime motion picture showing a group of tank soldiers hopelessly lost in the desert when the shell that wrecked their tank also destroyed their compass. The men were pictured taking to the trackless, sun-scorched waste unable to determine even the direction in which they were traveling. Even though the scenario writer or the director may have been ignorant of the outdoors and ways in which to determine directions, it is difficult to believe that trained men in an armored outfit were similarly ignorant. If they could be, their training had not been good.

To use your watch as a compass place it on a level spot, and hold a match upright on the center of the face so that it casts a shadow. Turn the watch until the shadow falls along the hour hand. The point halfway between the hour hand and 12 will indicate true North. Necessarily the watch must be going and must be approximately "on time" when it is being used in place of a compass.

The shadow cast by the soldier raising the flag shows that the sun was high when this action took place. Thus, a photograph, taken in sunlight, affords evidence that may be more conclusive even than an official report of the time of the event, or other circumstances in connection with it.



EVENING MOONS



MORNING MOONS

That the North Star, which is very close to the true North, may be located on a bright night by the so-called "pointers" of the Big Dipper, was known to the ancients, and probably to all primitive peoples. It is not so generally realized that the shape and position of the moon indicate the main points of the compass. It is necessary that one remember that the bright side of the moon must always be toward the sun, even though it be out of sight behind our earth. Considering that the full moon occurs thirteen times each year, one is surprised to note how many people, even though no longer young, do not realize that the full moon always rises at sunset.

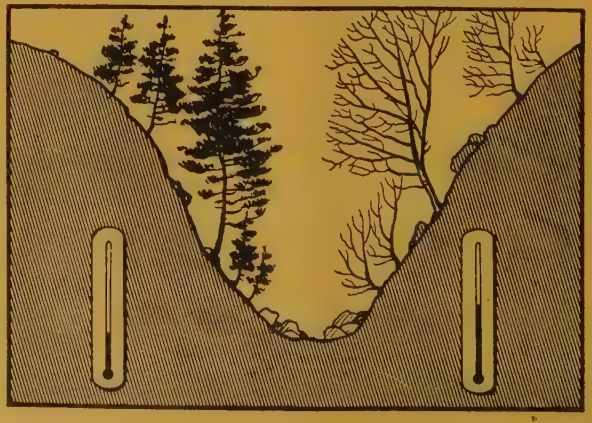
Let's Not Get Lost

When the soldier in the movie stepped out of his ruined tank, he was represented as not knowing which way to go, or even which way was north. His shadows showed on the ground with remarkable clearness, but this meant nothing to him, according to the story. Had he taken out his watch, rested a match on the center of the face and twisted the dial so that the shadow of the match fell along the hour hand, he would have known that north was half-way between the shadow and "12" on the dial. Here was a case where "The Shadow Speaks" in a most important way, and the sun's shadow is more dependable than a compass, whose needle may be deflected by nearby metal or by the fact that the magnetic pole may not be due north of the place where the compass is in use.

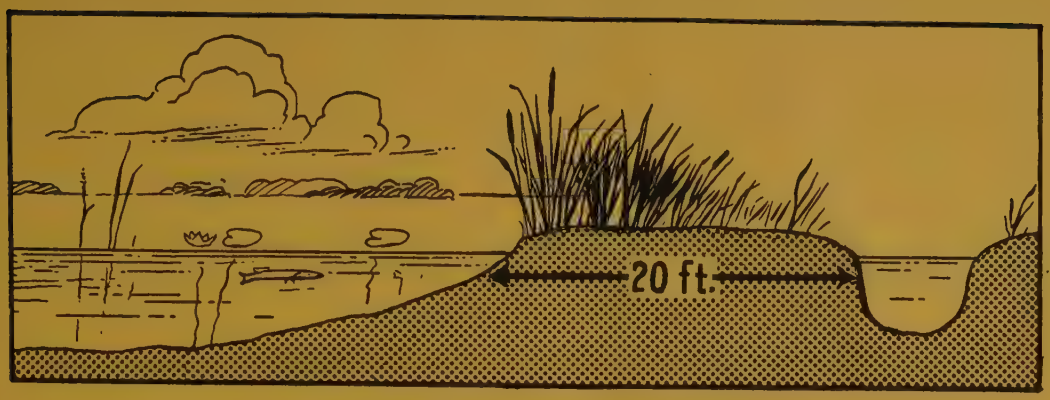
Of course, an outdoor person can determine north by some means other than by the shadow, which also may be used to tell the time of day. Sundials the world over do this, and experienced outdoorsmen can look at the sun and estimate with reasonable accuracy how much longer they will have daylight to continue their journey or their work. This is important if one does not wish to be forced to spend the night in the open, or to pitch camp in the dark. If you wish to use an understanding of shadows as a detective would, you might estimate at what time in the morning the flag was raised at Midway Island early in June, 1942, when the Japs attacked, as shown by a tracing of the Navy's official photograph of that event. When the sun rose, the shadow, of course, would have been extremely long. At noon, there would have been practically no shadow at that place at that time of the year. At about what time do you think the picture was taken, basing your opinion on reason and on the evidence of the shadow? If the photographer got up in time to take the picture in the morning, then of course the shadow would have been to the west of the soldier, and the soldier would have been facing east. This is merely one example of how shadows may be used to help people avoid getting lost in the open.

Of course, if you have a compass you should use it. You should learn how to adjust it so that the proper directions are indicated on the dial, and how to orient your map with the compass and with the horizon.

Even at night, it is relatively easy to get oriented if the stars or moon are visible. The Big Dipper with its pointers, which indicate the location of the North Star, is usually the first indicator sought by amateurs. The moon can be useful, too, if one remembers that the lighted side points towards the sun. If one faces a full moon in the evening, then he must be facing in an easterly direction. In the morning, one would face the west. A half moon will of course be in general to the south, with the lighted half towards the west in the evening hours and towards the east in the morning hours. One should be able to reason out from these conditions the directions indicated by cres-



In steep-walled gullies running more or less east and west, in our northern hemisphere, there is a tendency for the southern banks, being more or less shaded, to bear evergreen conifers, and the northern sides, with more direct sunlight, to be predominately deciduous in their covering.



Pure water, safe for drinking, may often be obtained by digging a well at a little distance from a pond.

cent moons. The diagrams on the opposite page will help.

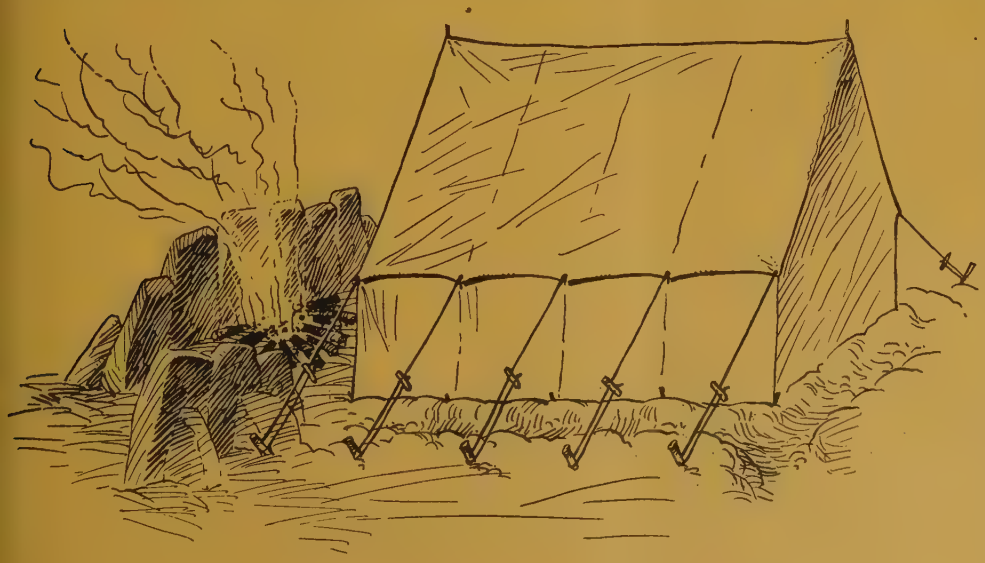
There are of course other signs of direction that should be noticed. In an east-west gorge the plant covering will almost invariably have more evergreens on the colder south side, which is less exposed to the sun in the northern hemisphere. Snowbanks along a sidewalk or roadside running east and west will usually be melted more conspicuously on the north side, which faces the south, and the snow will usually melt off the north side of a valley before it melts off the south side, which is not so directly exposed to the winter's sun. The seasonal movements of birds and other animals also have a significance to the outdoor person that would not be noticed by others. Of course, most of us know that geese fly to the north in spring and to the south in fall, that sea birds frequently fly towards their nesting sites or away from them, depending partly on the time of day. We hear that we can count on finding moss only on the north side of trees, and that the annual rings of wood in a tree are thicker on the south side. However, all of these phenomena are subject to so many variations that they should be used only as contributory to other evidence available, and only where the observer has a good general knowledge of the immediate area and the behavior of the organisms observed.

Of course, the most important advice about getting lost has little to do with compass direction. It has to do with controlling the emotions when fear begins to stalk. It is important that the lost one calm his fears. When calm has returned, he can begin to explore in various directions until familiar territory is discovered. In such explorations a trail should be marked so plainly that the place where he was lost may be located, or searchers can at least follow his exploratory trip.

How to Get a Safe Drink

Novelists enjoy dramatizing their stories by losing their characters and then depriving them of suitable drinking water. There is little doubt that many people suffer from thirst in places where they could get safe water if they only knew how.

Obviously, it is not safe to drink water from an open stream that may have drained away the wastes of a home, barnyard, or industrial plant farther upstream. Wells placed downhill from the farm barnyard, or where toilet wastes may reach them, should have an appropriate skull and cross-bones sign above them. Where streams are known to come wholly from uninhabited wooded hillsides, the danger of bad water is of course at a minimum. If a stream is to be used for bathing, washing, drinking, and



Here is a tent pitched on the shore of Great Bear Lake in northern Canada. Its occupant, a field naturalist, found it difficult to keep comfortable enough to do efficient work at the prevailing low temperatures without suffering from the eddying smoke of his fire. So he carried a few slabs of limestone from the nearby beach, and built a double wall before the tent. The generally westerly wind was caught by the longer wall, which extended beyond the sides of the tent, and, forming a sort of tunnel, carried away all the smoke, and reflected the heat from a tiny fire through the open tent door. In the absence of suitable rocks, a wall of logs would have served the same purposes. (Drawn from a photograph.)

For baking bread in a reflecting oven improvised from a rectangular gasoline or shellac can, or for "planking" fish or roasting meat, a fire provided with a reflector made of green logs, or, better, flat rocks, will prove useful. For baking "bannocks", frying-pan bread, many woodsmen have recourse to a dry stump with the roots intact, stood up and leaning on its roots, with the stump proper at the back. Against the root end of the stump, the fire is built, the resulting wall of fire and coals throwing out the quantity of heat that is so desirable for baking or roasting. A good bed of hot coals from hard wood is the ideal source of heat for these purposes.

for domestic animals, it is usually best to plan this use carefully. Ordinarily, drinking water for humans should come from the highest points. Farther downstream, there may be clean swimming or bathing pools, with provision for domestic animals, and for washing clothes still farther down.

If one is near a muddy lake or pond, reasonably clean drinking water may be had, if the soil is porous, from a shallow well dug some twenty feet away, to below the level of the pond water. This water may not be entirely free from disease organisms, but probably it will be cleaner than the ordinary pond water. Such water, and any other water that may be under suspicion, should be further purified before it is drunk.

The usual technique of purifying water in the open is to boil it a half-hour, let it cool, and then boil it again for a half hour. As an alternative, one may add one or two drops of tincture of iodine to each quart of water. Most hikers and campers carry iodine to treat minor accidents, so this is usually available. Some who wish pure water depend on halazone tablets, which they purchase at the drug store if they do not forget them. Two tablets stirred into a quart of water are considered adequate. It might be safest, if there is any question about these treatments, to use more than one.

Springs often yield such small amounts of water that they are rather unsatisfactory. Where this is the case and where the camp is reasonably permanent, a spring box with holes in one end and a barrier-dam of wood at the other may be helpful. When not in use, the dam at the free end is removed to keep the box flushed out.

Where there is a real shortage of water, a meagre supply may be wrung from some plants or even from the flesh of fishes, if these are twisted in a cloth. Water may also be wrung by this method from cloth that has become soaked in rain.

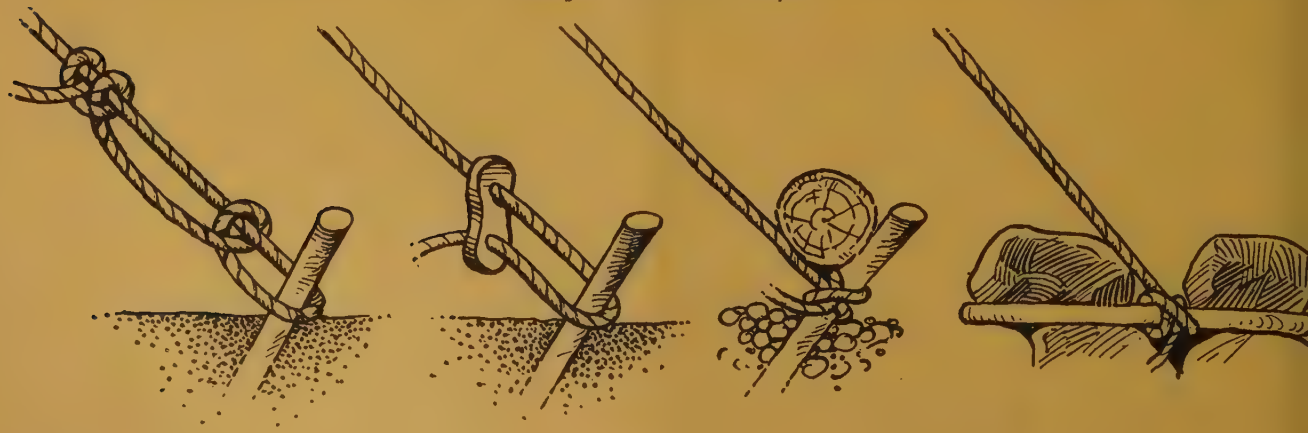
Every outdoor person can contribute to the effort to ensure an ample supply of safe drinking water by making every effort to dispose of garbage and other wastes that might otherwise be a source of contamination.

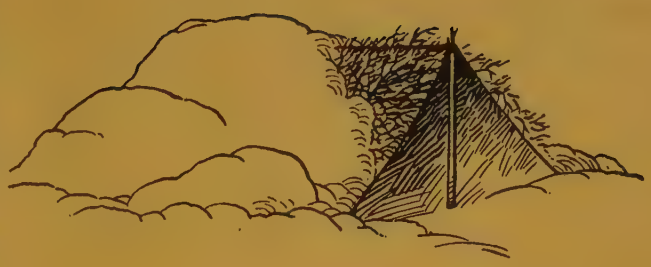
Water in the Wrong Place

Outdoor people may suffer from too much water as well as from too little. It is important to know how to keep dry, and particularly how to keep matches dry and to get dry fuel at any time and place.

Useful hints about fire-starting equipment are many. Some suggest that matches be dipped in paraffin or coated with shellac. When such matches are scratched, the coating is rubbed off and the match burns as well as ever, or even better. If a fire is to be built in the snow or rain, a candle is very helpful because it provides a steady flame sufficient to start fuel if nothing else is available. Usually, dry fuel may be had from dead treetops, or from beneath logs that are raised partly from the ground, or from cavi-

These tent-peg hitches and gadgets speak for themselves, and suggest methods of avoiding most of the difficulties that arise from soft ground, or from apparently suitable ground that is underlain by rocks. In most cases, if the peg is solidly driven, sagging tent ropes may be tightened by the half-hitch method, and wet weather, when taut ropes and tents are most needed, tends to help the situation by the shrinkage of both tent and ropes.

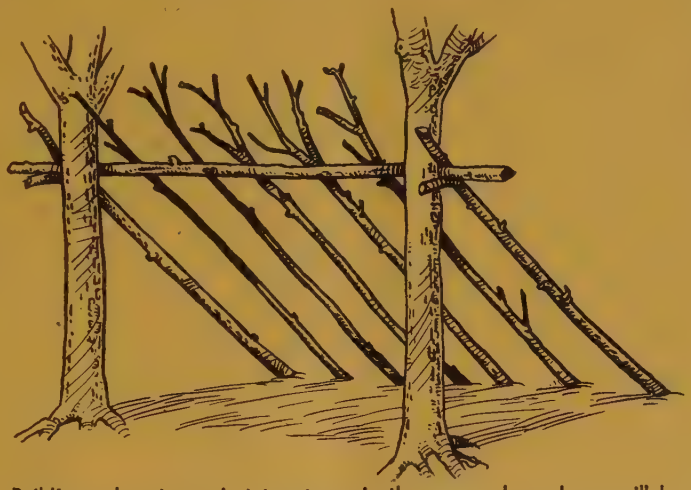




A small tent, well anchored, covered with a layer of snow over some brush so disposed as to carry most of the weight, will be much more comfortable than it otherwise would be. The ground, however, especially if deeply frozen, should be well insulated with some non-conducting material, such as dry leaves or small evergreen branches.

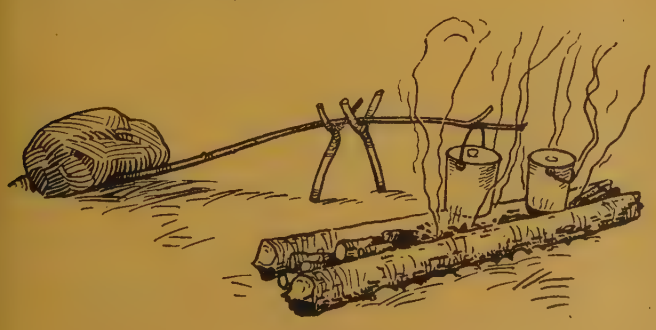
ties protected by rocks. Even ice-coated wood may be used, however. If the ice is chipped from any good standing firewood, the outer bark removed and the wood split, there will usually be enough dry fuel in the interior to start any reasonable fire. Fuzz sticks may be made by whittling the driest wood available, leaving the whittlings attached. A group of these sticks may be then stacked in a pyramid on a platform of wood or stone laid on the trampled snow. Care should be taken not to start the fire under a snow-laden tree whose burden may be loosened by the heat and in falling engulf the whole fire when it has become really useful. The newspapers each year print stories of people who die from exposure simply because they do not know how to build a fire in the open under difficult circumstances. There is much difference between lighting a Bunsen burner in a laboratory and getting a life-saving fire going in a snow-drenched swamp.

It is not comfortable to go around outdoors soaked to the skin, and usually it is not necessary. Amateurs frequently deck themselves out in ponchos with the long part hung over their backs like a roof. In going through a water-soaked forest one meets most of the water from in front and above. If one can keep the shoulders and front dry, the back will usually take care of itself.



Building a lean-to against two trees, in the manner here shown, will be found most satisfactory. The difficult or impossible task of planting two large supporting posts is avoided. The ideal covering is a piece of heavy canvas, but a waterproof roof may be made of branches and dry leaves. Such a shelter with fire in front is nearly as comfortable as a tent.

Campsites are chosen from various viewpoints—for the view, for protection from the wind, or for other reasons. Normally, a high, exposed campsite is too cold and windy, although it may be free from mosquitoes. A camp in a valley close beside a stream may, in some parts of the world, be washed out in the night by a cloudburst. It is well to choose the campsite so that the mosquitoes and flood danger of the valley, and the exposure of the hilltop, may both be avoided.



A long fire allows for the cooking of several dishes at once, without the discomfort that attends one of the bonfire type, which forbids a close approach. This is the ideal type of crane, as it permits instant adjustment as to position and height. The base may be anchored beneath a stone, log, stump or protruding root.

Incidentally, in extremely cold country, the valley may be even colder than the hilltops, so a generalization about a campsite may be unwise. In some parts of the world, people are advised to seek the valleys if they become lost and follow some stream down even though the travelling may be more difficult. This is not wise in regions where help can be seen more easily from the mountain top or where travel is safer there.

A campsite on a hillside should be protected from rain water that may flow down the hill. A suitable trench dug to form a V up-hill from the shelter may prove a wise investment of labor. If the trench is close to the tent, it may provide means of making the tent mosquito-proof if the sides are pegged snugly to the side of the trench. But the surest way to obtain relief from mosquitoes is an inner tent of cheesecloth with long walls to allow tucking in.

Tent-Peg Hints

One of the most tricky and undependable things used in camping is the tent-peg. It cannot be driven into rocks or ice. It pulls up too easily in sand or loam and when rain soaks the tent ropes, they tighten, and pull up the pegs.

A few hints on tent-pegs may be worth knowing. There is no doubt but that a tent rope tied with a half hitch, followed farther up by two more half hitches or a slip knot, is the best tie for variable weather. The knots may be slipped up or down on the standing part of the rope in case a storm comes up quickly and many adjustments must be made in a hurry in the dark. Every camper should know these knots and their uses.

If the ground is unsuitable for driving a peg, the ropes may be tied around a log heavy enough to serve the purpose in mind. If no such log is available, a bundle of sticks

tied with the rope may be buried in the soil. If the soil is reasonably firm but not thoroughly dependable, the peg's hold may be reinforced by laying a light log on the rope inside the peg. In rocky soil, the ropes may be tied to poles laid horizontally and weighted down with large rocks, or even tied to the rocks themselves.

Winter camping calls for some new peg wrinkles. Large spikes may be driven satisfactorily into the ice, or pits may be hacked out and rope may then be tied to sticks which become frozen into water poured into the pits. Other hints are suggested in the illustrations.

In this stove, made from discarded tin cans, the writer has cooked in twenty-two minutes, with half a peck of small sticks for fuel, a meal of bacon, eggs, biscuits and cocoa, and had them all ready at once.

Keeping Warm Outdoors

The usual physics course gives us little help when it comes to keeping warm outdoors, and many a physics teacher with all his knowledge of heat would freeze to death where an experienced woodsman would live in perfect comfort.

The chief source of heat to a person sleeping in the open comes from within. If that heat were used wisely, few people would freeze. Extra mittens and socks filled with the fluff from cat-tail tops, mats of cat-tail leaves laid thickly on the ground, a pup-tent covered with brush, and then with snow—these are but a few of the hints worth knowing, but never found in the text book. If a camp can get no stoves because of priorities on metals, or if a stove is needed along the roadside, one may be made from a discarded metal sign. Two oblong signs folded to form C's and bolted together with a few light stove bolts will make a surprisingly efficient stove for heating a lean-to or tent.

If one must sleep in the open and depend in part on a fire for heat, a reflector may be useful. However, when one sleeps close beside a fire he incurs the danger of ruining or destroying his bedding from flying sparks.

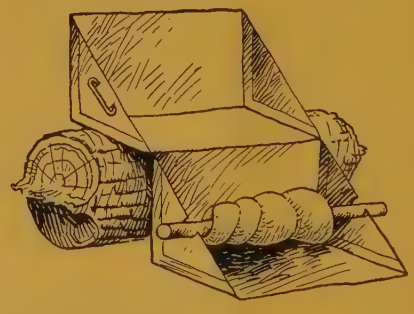
Heat for the Food

The usual fire built in the open by amateur woodsmen is an enormous thing that can hardly be approached; certainly it cannot be used. A small fire, which does a lot of good with little discomfort, is the badge of good woodcraft. A long, narrow fire serves well for both cooking and heat. A few cross logs over an open trench gives a simple reflector that is good for simple baking. If the burning logs of a fire are inverted and are propped high enough to slip a pan beneath, then an excellent baking fire may be made.

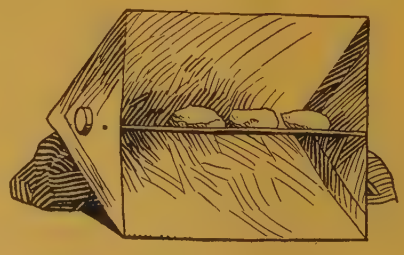
A stick supported at one end by a log gives a firm basis for suspending valuable stew over a camp fire. The writer's favorite crane is safer than any he has seen illustrated anywhere, and is easily made and can be set up anywhere. It may be shifted quickly to different positions and heights merely by changing the position of the supporting forked props.

Old tin cans properly used make excellent cooking utensils. Used singly, they cook only one dish at a time. However, they may be made to work together.

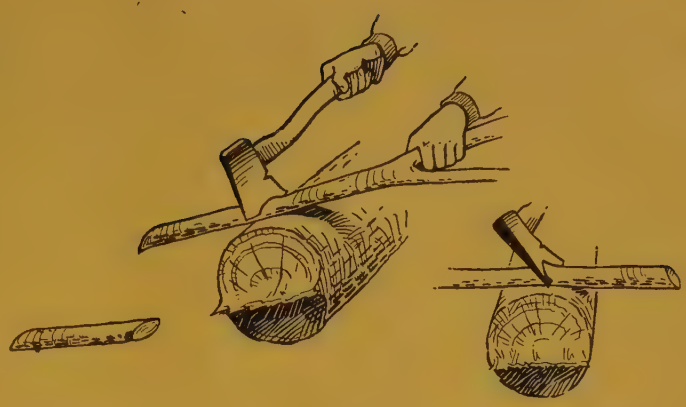
A simple oven is made by slitting a tin can down one side and letting the open side face the fire. Another is made by telescoping two cans and separating them by sticks so that the food in the inner can is not burned; another, by slitting a can lengthwise in half and setting one half as a roof over the other half, which has been flattened and on which the food is placed. Square oil cans make excellent reflector ovens and a one-pound baking powder can may carry the makings of two meals including bacon, eggs, cornmeal mush, soup and cocoa.



Here are shown two of the methods of utilizing small reflecting ovens made from a discarded gasoline or shellac can with a pair of heavy shears or tin-snips. In an emergency, such an oven could be made with a can-opener, or with axe or hatchet.



The writer has developed a tin-can stove in which he has cooked, in twenty-two minutes, with a total of half a peck of pencil-sized sticks, a meal consisting of bacon, eggs, biscuits and cocoa, and had them all done at the same time. The stove parts nest together and serve as a pail for carrying the food. The stove is a large oil can, the top of which is cut, as shown, with an axe, while the can is inverted over a piece of wood. The boiler and baker are coffee cans placed inside the chimney fryer, which is held on top of the stove. This is an efficient device.



Only practice can make a man master of an axe, but a few principles are illustrated here. In cutting even a small stick, one should place it across a log or stump, never on the ground, and strike it at an angle, not across the grain. Barring a gun, no implement is more dangerous in the hands of a novice than an axe.

Axes and Other Camp Tools

The highest skill in the use of the axe can be obtained only by practice, preferably when one is young, but a few points on its use and care, with special reference to the short-handled "camp" axe or a hatchet, may be of assistance to the novice. Some of these points are further explained by the illustrations.

Most axes, when they come from the dealer, are too thick at the edge to make ideal tools. This is because, in many cases, they are to be used by amateurs who may subject them to hard usage that will break a thin edge. The experienced chopper does not drive his favorite axe into a hemlock knot, but uses for such tasks one with a well-tried thicker edge. Bear this in mind when sharpening your axe, and remember further that the face of the blade should be as smooth as possible, to pass easily through the wood that the keen edge has opened. A carborundum stone, preferably with coarse and fine faces, is the best whetstone.

A rope in camp is as handy as a pocket in a shirt. In binding a number of poles for tent or firewood, use the timber-hitch and half-hitch here shown. Then the bundle may be dragged, or taken under one arm, and half carried, half dragged. If weight permits hoisting to the shoulder, this method may prove the easiest.

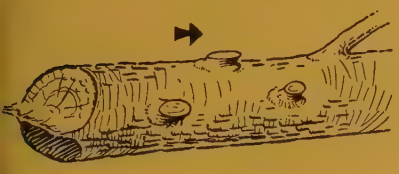
When chopping small wood, or sharpening a stake, rest the stick on a log or block, never on the ground, and in such a position that the axe will strike directly against the log, after passing through the stick. This will insure the most effective use of the force applied, will stop the axe safely, and will prevent the severed stick from flying into the air. Sometimes, in chopping on a block, if the first blow does not sever the stick, it is best to strike both stick and axe down hard on the block.

In striking a stick it is important that the axe or other tool enters the wood with the grain, not crossways. For the safety of the axe and yourself it is always best to place the stick against the far side of the log. Of course one must take into account the length of the axe-handle, so that the axe hits the right spot. In other words, the first principle in chopping is to learn to make the axe strike the exact place that the eye has picked. Inattention to this point may result in a broken handle, a bruised face, or a cut hand or foot.

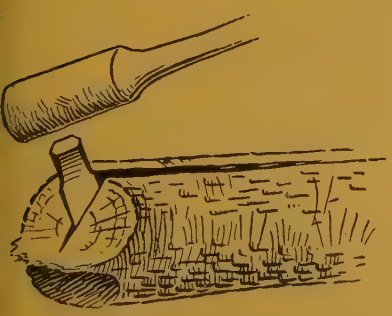
In general, a piece of wood may be more easily split by resting it against a log on the far side, and striking into its side close to the near end, rather than into its end.

A sharp axe is a dangerous tool (and a dull one is an abomination), so one should early learn how to carry it. Never carry one over the shoulder with the blade near the back of your neck. Probably the safest way is to hold it in one hand, grasping the handle close to the blade, with the cutting edge away from your body. A common and relatively safe method is to carry it hung in the hollow of the arm, with edge away from the body. This method presupposes that the arm be well-clothed. Accidents from this method are practically unknown. When handing an axe to another, it should be offered with the handle toward your companion. To guard against accidents, and to preserve its edge, an axe or hatchet should be protected by a leather guard when not actually in use.

The boy who wishes to possess a knife is starting right, for, next to an axe, a strong sharp knife is the most useful tool one can have in camp. By bending it down at a sharp angle near the ground, a two-inch tree can easily be cut with a good knife in a few seconds. Thus a serviceable lean-to may be built, if necessary, with no other tool. One should learn to control a knife so that it does



In trimming a tree the limb should be struck close to the trunk, and away from the butt. In this way a neat cut is made, and the blow gives greater results. An expert axeman will easily sever a two-inch limb with one blow. Strike a wedge with a wooden club or mallet. Do not use your axe to drive a metal wedge, nor use your axe as a wedge.



not slip and cut the user or another. To cut the artery on the inside of the leg above the knee is a rather common and very serious accident. In general the old advice to cut away from you is sound. However, the Indian's "crooked knife" shaped much like a farrier's knife, and used much the same way, always cuts toward the operator. The Eskimo have a somewhat similar tool that has a long handle and is held by the hand and forearm. Both these are for fine work, and the cutting edge can best be controlled if turned toward the user, who can see clearly what he is doing, and can guide the edge.

Saws

A saw is essentially a group of little knives so mounted that working together they do more work than could be done with a knife or an axe and with less expenditure of energy. They should be closely examined before they are used, and should be used for the particular kind of work for which they are designed.

A rip-saw is designed to cut with the grain. The teeth are set so as to chip out little pieces by breaking the grain lengthwise. They are set alternately at different angles to provide working room for the saw.

A cross-cut saw is a series of little knives designed to slice across the grain rather than to force the grain to break loose as is the case with the rip-saw. Every other tooth is set to cut off the right side and the alternate ones to cut on the left. The knives or teeth are filed and set to do the most cutting when the saw is forced forward. Some oriental saws are set to cut best when the saw is drawn back, and some of our forester's trimming saws are used in the same way.

Timber-saws are set to cut equally well when the saw is drawn in either direction. In the regulation set, the teeth cut alternately from opposite sides.

The champion timber-saw teeth combine those of rip-saw and cross-cut saw. The pointed teeth shave off alternate sides of the cut, while the forked teeth rip away at the exposed surface and force the chips out from the cut. It is important that all teeth have their tips in line except for the set necessary in the cutting teeth.

The lance-tooth timber-saw is a modification of the champion-tooth timber-saw. There are two adjacent pairs of cutting teeth between the shorter raker teeth; these latter drag out the fragments cut by the cutting teeth.

The Rope

Rope is recognized by expert campers, primitive and civilized, as one of the most useful aids to successful outdoor living. The Eskimo of Arctic America feel so keenly on this point that, while the smaller seals belong to the individual hunters, the large gray seal, from whose skins they make their strongest cords, is considered so indispensable to the tribe that it must be shared with the community. The penalty of evasion of this duty brings to the offender the scorn of his associates, a most severe punishment in their code.

Many motorists carry a strong towing rope in their cars, to aid others in distress, for even a small car can exert an astonishing amount of power in the movement of heavy objects, especially if backed by strong levers. For lighter work smaller ropes can be used in innumerable ways.

Useful Texts

There is a wealth of books and pamphlets, some of which may be profitably consulted by those interested in outdoor problems. If we are to put all of our healthy high school students into the armed forces, it would seem that an understanding of outdoor living problems should be a part of both pre-induction and post-induction training. Certainly it will be a part of the life most of them will lead and it will not be limited to one in every hundred-thousand, as some would have us believe. Here are cited a few of the more useful references, including a leaflet by the writer of which this article is a modification.

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Outdoor Living. By E. Laurence Palmer. Cornell Rural School Leaflet, New York State College of Agriculture, Ithaca, New York. 1941.

Camp Fires and Camp Cookery. By E. Laurence Palmer. The Slingerland-Comstock Company, Ithaca, New York. 1932.

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American Boy's Handy Book of Camp-lore and Woodcraft. By Daniel Carter Beard. J. B. Lippincott Company. Philadelphia. 1920.

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Camper's Manual for the Novice and the Expert. Outdoor Life. New York City. 1942.

How to Camp Out If You're Bombed Out. By Ellsworth Jaeger. Buffalo Museum of Science. Buffalo, New York. 1942.

Wild Foods. By Eva Gordon. Cornell Rural School Leaflet. New York State College of Agriculture, Ithaca, New York. 1943.

As We See It

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Important Billboard Decision

BILLBOARDS, we suppose, still clutter the environs of our rural highways. In common, however, with millions of other Americans, we recently have had neither the gasoline nor the justification to drive out and check up on the varied sales appeals now being wasted upon the empty air. Nevertheless, our interest in the eventual restoration of the rural outdoors is still active. We are delighted, therefore, to read the recent wise and important decision in an outdoor advertising case by the Supreme Court of the State of Vermont.

It all began several years ago. The outdoor advertising industry discovered, probably to its own amazement and chagrin, that it had overlooked adorning rural Vermont with its "outdoor art". Setting about to remedy this grievous situation, one advertising company erected several large and screaming boards on the approaches to lovely Springfield. They picked the wrong spot, for one resident of that community was an artist of note, Horace Brown. The naturally beautiful landscapes of New England were a passion with him, and, outraged, he led a local uprising against these alien intruders. He won that local fight, and, in the process, a distaste for the methods and machinations of the industry he was forced to fight.

Determined that the rest of his State should not surrender to the industry, Mr. Brown announced his candidacy for the State Legislature, was elected, and promptly led a successful fight for a billboard regulatory law. Under this statute the boards were forced back from the highways, the distance being in proportion to their size. They were also taxed on a square-foot basis. Proper exceptions were made for boards on places of business, and offending signs were given three years to get out, one-third each year.

For two years all went well. Many signs were removed entirely; others were made to conform with the law. Then came war and what appeared an opportune moment—with the public attention diverted—to make an issue. One company refused to remove offending boards. The State threatened to take them down. The company brought suit to test the constitutionality of the law and their rights under its provisions. They appear to have made a mistake in doing so, for the decision of the Court is far-reaching in its impact and application.

The billboard company pleaded that it was being deprived of certain inherent rights; that a law that allowed the owner of a piece of property to advertise its sale, or the sale of wares raised upon it, and denied a billboard company the same right, was all wrong.

In its decision of January 5, 1943, however, the Vermont Supreme Court unanimously held "that a billboard erected on private land in order to be seen from the highway is not so much a use of the private land as it is a use of the highway; and regulation of billboards is thus not so much a regulation of the private property as it is a regulation of the use of the public thoroughfare." The Court found itself in hearty agreement with the great decision of the Massachusetts Supreme Court in 1935, which upheld the Bay State law.

The Vermont Court then considered the private landowner's rights, among which "is that of visibility from the highway for purposes connected with his own property, but for such purposes only. This right is in the nature of an easement over the highway, but is limited to a benefit to his own property. He has no legal right to extend that easement to others or to increase the burden upon the highway."

This subject of easement rights had been deeply studied by a New York lawyer, Miss Ruth I. Wilson. She had published her findings in the *Georgetown Law Journal* for June, 1942. This article was tellingly used in the Vermont case, and its legal facts have wide application with respect to billboard regulation.

Finally, the Court pointed out that the greater privileges allowed by the statute to advertisers not engaged in the outdoor advertising business "are matters of sufferance rather than of right. These privileges may be permitted to some classes and denied to others under the police power, according to the legislature's idea of the public welfare. *There is no inherent right to use the highways for commercial purposes.*"

The italics are ours. They are used because again this sentence denies the claim of the outdoor advertising industry that it must be considered as identical with whatever other commercial uses may be made of the highway or its environs. As much as Nature abhors a vacuum, the outdoor advertising industry abhors, for the purposes of regulation, to be placed in a class by itself. The Vermont decision does just that, and adds importantly to the mass of legal precedent that will eventually force the outdoor advertising industry to cease operating in defiance of the public interest.

Eph Palmer on one of the paths leading through the nine-acre tract that has been set aside as a memorial to his son, the late Laurence Van Winkle Palmer. In this outdoor area he is able to work out many of his Nature study ideas that will be passed on to others.

In a third-grade classroom was sown the seed that made a Nature leader of—

E. Laurence Palmer

By EDWIN WAY TEALE

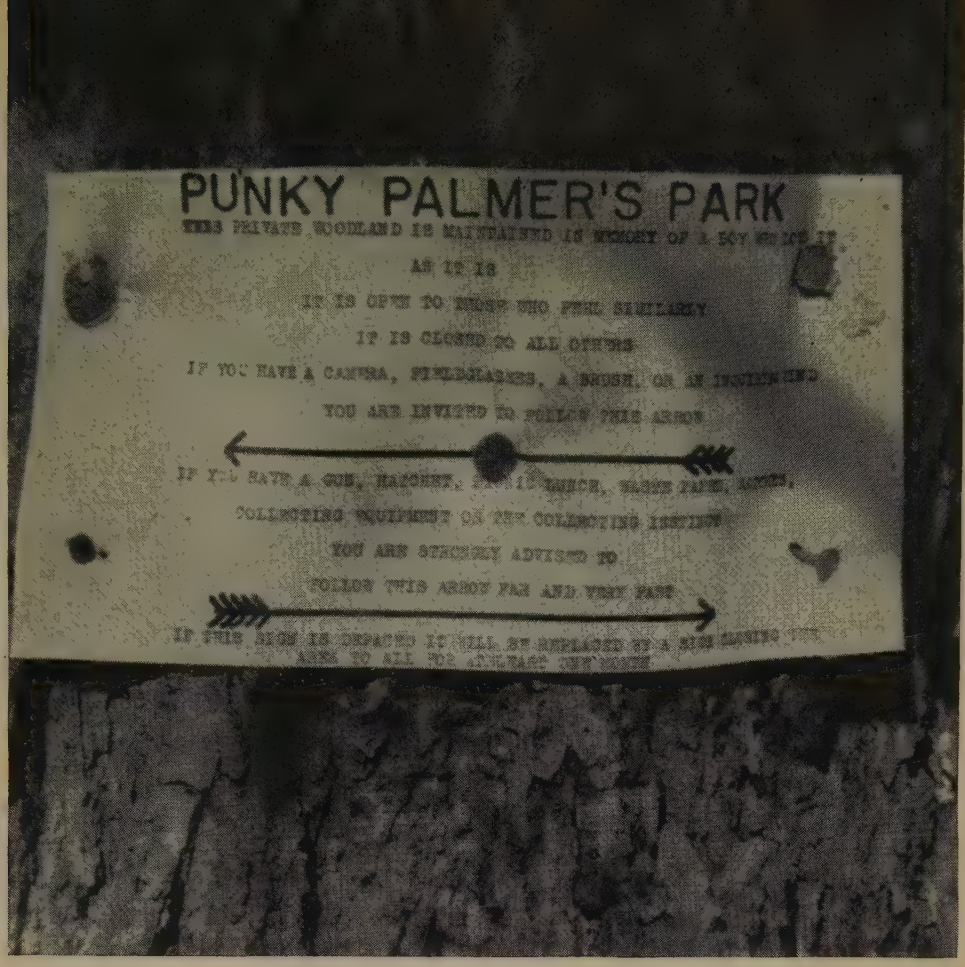
Photographs by the Author

One winter day, nearly fifty years ago, Mrs. J. Mumford Keese, a substitute teacher in the little northern New York town of Cortland, passed around to her third-grade pupils some of the first of the famous Cornell Nature leaflets. The story of what happened as a consequence illustrates anew how widening rings of influence may have their start in any classroom.

Says the Swiss philosopher, Henri Amiel: "Almost everything comes from almost nothing." So, from this simple act came an outstanding career in Nature education, and work that has carried the enthusiasm it engendered to millions of other American children. For, one of the boys in that Cortland classroom was a seven-year-old named Ephraim Laurence Palmer.

The pamphlets—one on tent caterpillars and one on collecting insects—interested him in the infinitely varied forms of his six-legged neighbors. During the following summer, he spent much of his time wandering over fields and through woods on the hilly outskirts of Cortland. His collection of beetles and butterflies, moths and grasshoppers, continued to grow. By the time he was in high school, he had filled so many cigar boxes with carefully labeled specimens that they filled two shelves, each four feet long and eighteen inches wide. It was this insect harvest that led him into the endless pleasures of Nature study, and eventually shaped his life-career.

At the Cortland, N. Y., State Normal School, where he earned part of his expenses by working in the library, a second seemingly unimportant event turned the course of his activity into another channel in the realm of natural history. The librarian, a Latin teacher with scant interest in the sciences, decided to throw away all the reports of the Smithsonian Institution. Young Palmer salvaged a few of the books. Among them was the famous Jordan and Evermann report on fishes. These volumes stimulated his interest in fishes as a part of Nature, not as stuffing for a creel, and set him to studying the mysteries and problems and the life histories of these underwater dwellers.



Signs like this are nailed to the trees along the paths in the woodland tract. So far Dr. Palmer has had virtually no trouble from unwelcome guests. Those who come to the woods enjoy it without molesting growing things or the wildlife that finds sanctuary there.

Let it not be said of us that a prophet is not without honor save in his own country. Readers of Nature Magazine have long known the work of Eph Palmer in these pages. To the majority he has been only a name, but here Mr. Teale gives all an opportunity to know better a man whose influence in the field of Nature education has been incalculable, and, we may add, he is a "swell guy."

Upon completion of the normal school training, he had planned to take up forestry at the University of Michigan. A state scholarship, however, took him to the botany department at Cornell. This university—where David Starr Jordan had been the first assistant in botany, and the great Louis Agassiz himself had lectured—has been the hub of his activity during almost all of the more than three decades since.

During his undergraduate work at Cornell, Palmer specialized in botany, and at the beginning of his third year there he was appointed assistant in botany under W. W. Rowlee. This training widened still further the foundation of his knowledge in natural history. In 1913, the year he received his Master's Degree, the university hired him to spend his entire summer in the field collecting the plants that were the first specimens collected for the Department of Botany of the College of Agriculture, which is now responsible for the herbarium of the university. Most of this work was done in the rich collecting region formed by the hills, ridges and ravines near Ithaca.

While Palmer was working for his Doctor's Degree, in the years just before the first World War, he attended the Nature education classes conducted by Anna Botsford Comstock. Later, when this beloved teacher retired, she selected him as her successor.

For upwards of a quarter of a century, Dr. Palmer has been carrying forward the great work instituted at Cornell by Mrs. Comstock and such other pioneers in Nature study as Liberty Hyde Bailey, "Uncle John" Spencer, and Simon Henry Gage. Since 1919, he has edited the Cornell Rural School Leaflet—the modern version of the very pamphlet that, so many years before, had first stirred his interest in the natural world about him. These "Cornell Leaflets" have grown in importance and influence through the years. Approximately 90,000 rural New Yorkers receive them four times a year, and the total number of copies printed annually is more than 400,000.

They provide a Nature encyclopedia in serial form. Their subject matter ranges from fungi to prehistoric animals and from astronomy to insects. How much the successive decades of these leaflets have done for conservation, for Nature study, for enriching human lives, it is impossible to estimate. Nowhere have teachers and students been supplied with more effective material for the study of the wonders of the outdoors.

Most of these leaflets are prepared week-ends and

Montage of some of the animal drawings by Louis Agassiz Fuertes that had been lost for more than a decade and were found by Dr. Palmer among accumulated papers in the office of the old Slingerland-Comstock Company in Ithaca, which Dr. Palmer recently acquired.

during odd moments in Dr. Palmer's heavy schedule. They represent only part of the output of this effective and indefatigable worker for Nature. The special inserts, which for years have been a popular feature in *Nature Magazine,* are worked up between terms and during summer months. Ever since 1925, Dr. Palmer has been Director of Nature Education on the staff of this magazine. His contributed fifty pages a year have proved of continuing interest and inspiration to a nationwide—even an international—audience.

More than 4000 students have taken courses directly under his instruction at Fernow Hall. A dozen or more have won doctor's degrees by special research, some with the assistance of fellowships made available by the American Nature Association. Dr. Palmer's department is probably the only place in America where it is possible to obtain a Ph.D. in Nature Study. By his courses in outdoor living, teaching methods, Nature literature, and Nature study, he prepares young teachers to carry on the grand tradition of the Cornell Nature-study idea. Like chain letters, the enthusiasms he thus instills spread outward, reaching an ever-increasing number of people.

On various occasions, he has been called to other universities to give summer courses. For two summers, and a half-year, he was at the University of California; for three summers, at Iowa Agricultural College; for three, at the Utah Agricultural College; for one, at the University of Washington. In 1931, he even traveled to the Hawaiian Islands to give Nature-study courses at the University of Hawaii.

Letters, coming in from teachers and students, reach a total of between 5000 and 6000 a year. All this mail—literally bushels of it—is carefully answered. Dr. Palmer also works up a weekly Nature program to be broadcast by radio. Students from various schools in the vicinity of Ithaca appear in a kind of natural history, non-smart-alec "Quiz Kids", feature known as "This Week in Nature." Now in its 16th year, it has been a popular program on an Ithaca station. It is now transcribed for rebroadcast through other stations.

By books, as well as by lectures, articles, letters and radio programs, Dr. Palmer spreads his infectious enthusiasm for the open world. His own volumes, such as *Fieldbook of Nature Study, Guide to Science Teaching,* and *The Nature Almanac* (written with Arthur Newton Pack), have had wide distribution. Recently, he has been editing a series of Nature books for the publishing firm of McGraw-Hill. Among them were Gayle Pickwell's *Deserts,* and *Animals in Action.* Nearing completion is a new book of his own. He has been working on it for ten years. (Continued on page 332)

Nature in Print

By HOWARD ZAHNISER

THE most impressive accomplishment of American wildlife conservationists has been the establishment of refuges throughout the country—throughout the continent, in fact. Other achievements may rival the refuges in importance but hardly in impressiveness. The credit for such success as has been realized in restoring, increasing, or maintaining the numbers of the wild creatures for which these protected areas are provided is, of course, divided between the advocates of refuges and those who have seen that hunting regulations are as strict as they are. If this credit could be apportioned, perhaps the greater share would go to those who have been successful in restraining the American sportsmen and other hunters, but such an apportionment could, of course, be only theoretical. Refuges themselves are restrictions on hunting—operating in the dimension of space in somewhat the same way that closed seasons occur in the dimension of time. American wildlife conservation has thus made its forward strides on two legs—a biped movement that could only awkwardly stand, and not move, on one leg alone. Fortunately, then, the restriction of hunting and the establishment of refuges have kept pace. Yet as far as public interest is concerned, the refuges have always been the foot that is most easily put forward. There is nothing thrilling about a law or a regulation to keep human activities within bounds, but there is something deeply moving in the sight of an expanse of land and water where wild creatures abound and can move about in their wildness without the "artificial" fear of gunfire. And there is an inspiring satisfaction in knowing that such areas are spread across the country and are increasing in number, from the Atlantic to the Pacific, from Alaska to Mexico. The establishment of entire systems of wildlife refuges is a most impressive accomplishment, indeed.

This being true, it is surprising that our literature of the outdoors that has achieved the dignity of book publication has, until now, included no elaborate work on refuges. Newspapers have satisfied a great deal of reader interest in "features" with accounts of refuges. Magazines have published many excellent articles. Such books as Raymond S. Deck's *Pageant in the Sky* have been enriched with chapters written under the influence of refuges. Strangely enough, there have been no full-length volumes comparable with these newspaper features, magazine articles, and book chapters.

The nearest thing to a book-length description of refuges that we have had has been a committee print of the United States Senate's wildlife committee—a publication prepared some half dozen years ago in what was then the Bureau of Biological Survey with the appealing title *Wildlife and the Land: A Story of Regeneration.* This report discussed the purposes of the national wildlife refuge program and described in some detail the individual areas, but unfortunately it has not been kept revised and in print. It is now not only out of print but also outdated by the many revisions that half a decade has made in the development of the refuges themselves.

In these circumstances American readers can indeed welcome Dr. Ira N. Gabrielson's most recent volume, entitled *Wildlife Refuges,* and they can be especially thankful that war conditions have not restrained its publication.

"Dedicated to those pioneer conservationists whose long and valiant efforts laid the foundation," Dr. Gabrielson's book would be considered a gratifying tribute by any of those to whom its dedication is made, and fortunately some of the pioneers are still amongst us, so comparatively recent has been the remarkable growth of the system established on their foundation. To those pioneers who have lived through these years of development and to those who might behold it from the land from which there is no return, this tributary volume must seem astounding as well as gratifying, so imposing do the accomplishments appear when gathered into one volume.

Never before has this been done. Never before in one volume has it been possible to read descriptions not only of the areas administered by the United States Fish and Wildlife Service, but also those in the custody of other Federal agencies, those established by Canada and Mexico and by all but two of the forty-eight States, and those maintained by such nongovernmental agencies as the National Audubon Society and by other private groups and individuals. The United States national wildlife refuges total 272 with more than 17,500,000 acres, in addition to the Federal sanctuaries that are national parks, the Federal game areas of national forests, and the wildlife areas of the Soil Conservation Service, all of which would raise the number of refuges on our national lands to nearly 500, and the acreage to considerably more than 40 millions. Dr. Gabrielson, realizing the confusion of combining various kinds of statistics, makes no estimate of the continental total, but a cursory survey of the volume's statistics makes it apparent that in the United States alone there must be considerably more than 10,000 (Continued on page 330)

Nature serves to create vivid mental pictures in—

Chinese

Proverbs

By MABEL IRENE HUGGINS

Chinese pictograms by Charles A. Stanley

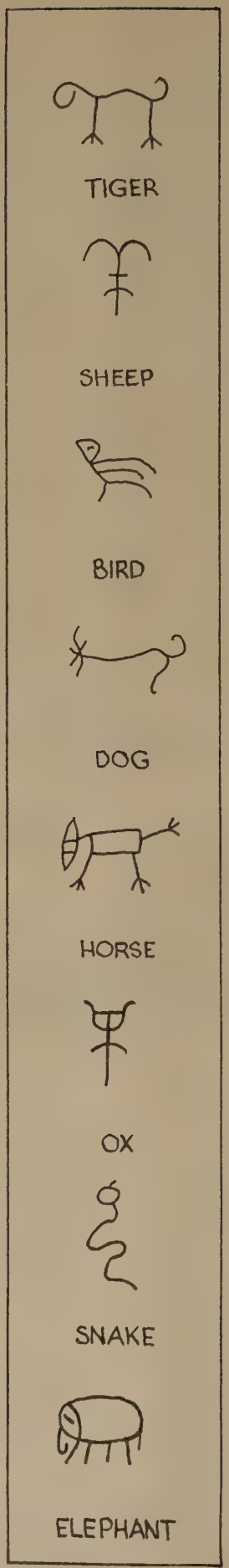
"Go to the ant, thou sluggard" is never said to the Chinese loafer. He is more likely to be told that "the silkworm spins silk; the bee makes honey." Fundamentally identical, these proverbs have gone to Nature for their wisdom. In just this way our maxims can often be matched with ones from China—showing, perhaps, that philosophic observations are much the same no matter on which side of the earth people live.

Such Chinese sayings have a freshness and vigor of statement that ours have lost, partly through frequent repetition and partly because of their more abstract character. "Nothing ventured, nothing gained" becomes far more animated in the vivid language of its Chinese version, which asks, "If you do not go into the tiger's den, how can you catch the tiger's son?" "It's never too late to mend" inserts a concrete quality in its Chinese form by saying, "Having lost one sheep, if you take the trouble to mend the fence, it is not yet too late." These references to tigers and sheep produce lively mental pictures that give a certain forcefulness to the thought in the proverb.

The kind of wisdom that declared "What a man sows, that shall he also reap" showed itself in China in the proverb, "From a chicken's grass nest, a phoenix will not come." As almost everyone in China knows, the mythical phoenix occupies the zenith of importance among birds. From its dwelling-place in the highest heavens, it approaches man only to herald auspicious events.

"Birds of a feather flock together" has its exact counterpart in the Chinese maxim, which says: "People gather together with those of their own kind; birds fly with their own flocks"—a proverb that, in translation, loses something of its native pithiness.

When the Chinese express the idea that a person cannot cover up his true character and appear better than he really is, they neither refer to a wolf in sheep's clothing, nor do they talk about a leopard that cannot change his spots. Rather they say, "Powder and wash a raven until he is white, but he will not look white long." Or, "Rear a wolf as a dog, but it will be difficult for him to guard your home."



Many Chinese proverbs have the couplet-like construction that we note in the two just mentioned. Another of this type is about loyalty. "A good horse cannot carry a pair of saddles; a loyal minister cannot serve two masters." One need say only the portion about the horse, and his hearer knows immediately the real implication.

About a person who is too talkative, the Chinese do not suggest that his tongue is fastened in the middle and loose at both ends, but that he is "a long worm (that is, a snake) with two brain-bags," which means that with two heads he is such a talker that there is no way of answering him. When people talk about matters which they do not understand, the appropriate remark is: "A summer insect should not converse about ice; a striped green frog in a well should not discuss the sky." The wisdom of prudent speech is urged by the familiar saying, "After a word has been spoken (literally, gone from the mouth), it is difficult for four horses to catch up with it."

Although cattle are highly valued in China because of their part in carrying on the agricultural work of the land, they are considered stupid. Consequently, a person who has unsuccessful dealings with a bump-on-a-log sort of individual may speak of having "played a lute to an ox."

Undue desire for position has not been overlooked in these sayings. "Thinking to sit on a high peg, the woodpecker flies to the top of the flag pole" may be said of a person whose aims are too ambitious. If someone falls short of his ambition, he "tries to draw a picture of a tiger, but it turns out to be a dog."

Perhaps the climax of all such Chinese proverbs is that which states that "the mind of man never has enough, but is like a snake trying to gulp down an elephant."

As rationing tightens its grip and shortages develop, millions are planning on—

Putting the Garden Away

By ANDREW AND JANET WING

ONE of the slogans during World War 1 was, "Can the Kaiser". This war year the produce of many Victory Gardens will "Hit Hitler". Foods put away on shelves for use next winter will make a valuable contribution to our fighting country's food supply.

The April Gallup poll indicated that 25,500,000 families intended to do home canning. As the rationing system tightens its grip on all civilians, the number is likely to be increased. Millions of families will be processing vegetables and fruits for home use for the first time. So they are seeking advice on how this can be done safely and without waste.

There is no mystery about these processes. The principles have been well understood for years, and the practices are well-established. With a few exceptions there is not much difference in technique between the methods recommended now and those used by our mothers and grandmothers.

This year the choice is either to put them up yourself or do without many of the good things we have come to accept as part of the American way of life. In addition to the pleasure of eating vitamin-rich vegetables and fruits from our own shelves, it is both the thrifty and the patriotic thing to do.

The easiest way to conserve certain garden products is by storing. A cool room in a basement, or a pit cellar dug in a dry spot in the garden, are ideal places to store apples, potatoes, root crops and cabbage. Squashes, sweet potatoes and onions need a drier, warmer temperature. Parsnips and salsify keep perfectly and are improved in quality by leaving them right where they grew. Dried beans, soy beans and peas may be kept in bags or in metal containers. All these things are fairly easy to keep without any processing whatsoever.

The more perishable crops require special care. The four ways to preserve natural foods are; (1) by heating to destroy the enzymes and other organisms and then keeping them hermetically sealed; (2) by brining, as with pickles and sauerkraut; (3) by drying or dehydrating to remove enough moisture so that fermentation cannot occur; (4) by quick-freezing.

Food put away on shelves for use next winter will make a valuable contribution to our fighting country's food supply. How would you like to have a "library" like this in your cellar? You can have it by canning and putting the garden away.

The heat process is always used in canning. The cold-pack method is now frowned upon; and oven-canning is condemned by current authority. The thing to bear in mind is that the acid vegetables such as tomatoes, and the fruits, which are also acid, are easily handled by cooking in an open kettle, or by placing them in closed but not sealed jars and heating in a water bath at a boiling temperature (212°F.).

The starchy, non-acid vegetables such as string beans, corn and peas are more difficult and require a thorough heating with steam under pressure at temperatures of 240° to 250°F. in order to be absolutely safe.

The old-fashioned open-kettle method, while it is not viewed with as much favor as the water bath or pressure methods by home economists, is a practical way for people who do not own canning equipment to put up tomatoes and fruits. The only major equipment you need is two good-sized kettles, one for cooking and one for sterilizing your jars and caps. You also need for this method (as well as for the water bath and pressure methods) jar tongs or holders, a jar-size funnel and a ladle. Stew the tomatoes in their own juice, cook the fruits in syrup; ladle them boiling hot into the jars on which you have placed the rubber rings; fill the jars right to the top with the hot juice and seal immediately.

The trick to this method is to have everything sterile. Jars and tops are sterilized by fifteen to twenty minutes boiling, then filled as soon as they are lifted from the water. Rubber rings are dipped into boiling water just before using. Jar caps that have a sealing composition are prepared by pouring boiling water over them. Be sure that your ladle and funnel are also sterile; do not wipe off the tops of jars with a non-sterile cloth before putting on the tops. Fill the jars at the stove.

Many homes have—or can improvise—the equipment for canning by the hot water bath method. You need a vessel—wash boiler, bucket or kettle—large enough to hold several jars of food and cover them with water one or two inches over the tops. The vessel should have a tight cover and should be fitted with a rack of metal or wood to hold the cans off the bottom and separate them so that the boiling water can circulate freely. Jars do not have to be sterilized for this method—just thoroughly washed. The water must be boiling before you put the jars in. To keep the jars from breaking they must be pre-heated in water, or filled with hot food.

If you have a pressure cooker large enough for canning, or a pressure canner, you are lucky. All the delicious fresh vegetables from your garden can reappear on your table when winter comes. Pressure cookers have disappeared from the stores—so share yours with your neighbors. If you do not own one, perhaps you can find someone who will share hers with you. Many communities are organizing canning centers, or already have them. You can find out what is being done—or perhaps organize such a center yourself and take your garden produce to it.

In canning by the water bath or pressure process, jars are filled to within half an inch of the top—one inch from the top in the case of starchy vegetables such as corn, peas and lima beans. Zinc-top mason jars are not sealed tight during processing; screw tight, then turn back a quarter inch. With glass-top jars, put wire in place over top, but do not push down the side wire. Immediately after processing complete the sealing. With vacuum or self-sealing jars, put the screw bands on tight or adjust the clamp before processing.

Whatever processing method you follow, use tongs or jar holder to remove jars after processing. Cool

them, out of drafts, on a surface on which you have laid several thicknesses of cloth. After they are cool, invert all jars equipped with rubber rings and observe for leakage. Test jars with lacquered metal tops by tapping the top with a spoon. The seal is complete if you hear a clear ringing sound. Store the jars in a cool, dry place and protect them from the light so that colors will not fade.

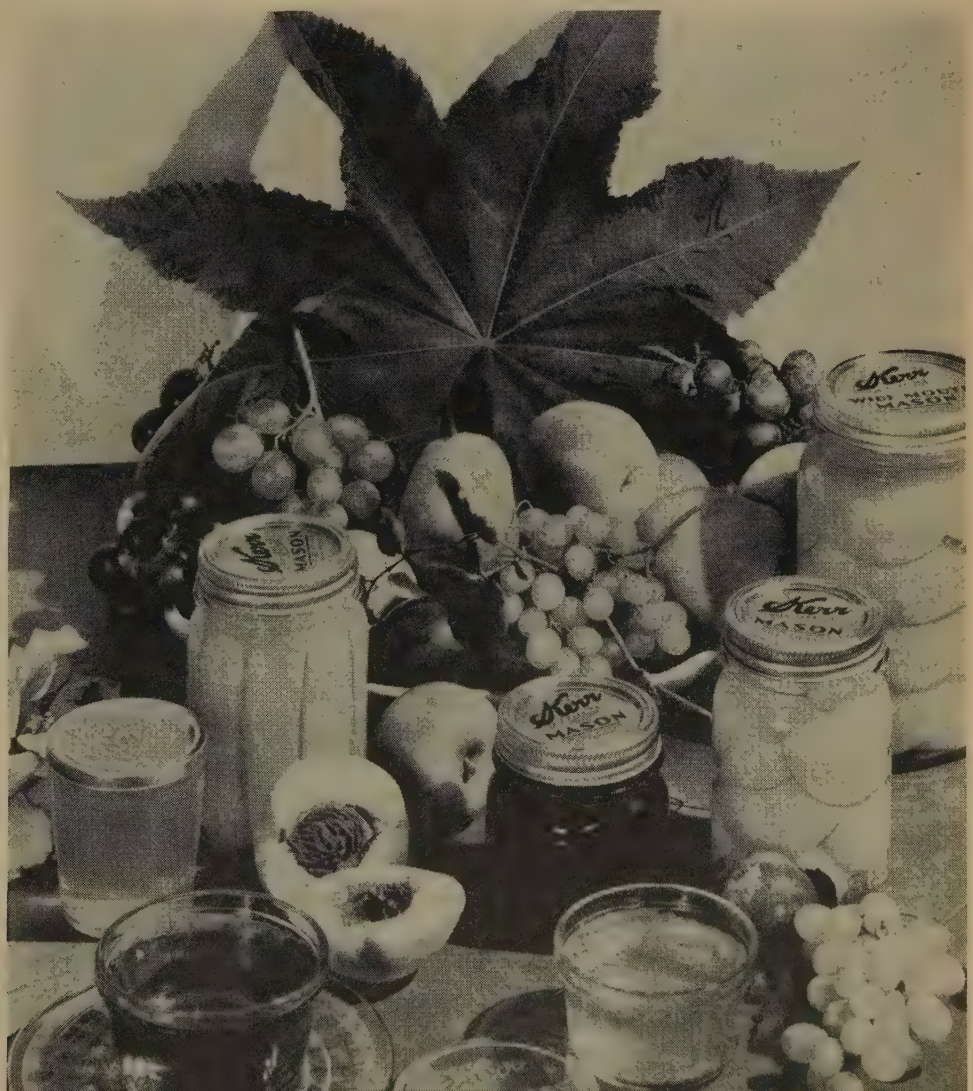
Last summer extra sugar was not allowed for jams and jellies. If it should be this summer—to encourage using preserves instead of butter as spreads—you will get a lot of pleasure out of these additions to your larder. No special equipment is needed. For fruits that contain little pectin, consider using commercial pectin in liquid or powder form. It cuts the cooking time way down; fruits keep their fresh flavor and color better; and you get more jars or glasses of preserves from your fruit. This latter fact compensates for the fact that the amount of sugar required may seem alarming.

Right now is the time to figure just how many glass jars you will need for the season's canning. Draw up a preliminary list of the number of jars of each kind of vegetables and fruit your family can eat—and your garden can produce. If you have canned before, get out your empty jars, inspect and count them. It is not too early to start buying the new jars you will need for the summer. If jars go short, a new supply can be made.

The products listed by the Department of Agriculture as suitable for drying are: apples, apricots, pears, peaches, figs, corn, shelled green beans and peas. To these we would add parsley, mint and many kinds of herbs. You will find directions for making portable dryers to be used in the sun or with artificial heat in the bulletin mentioned at the end of this article.

Kraut may be made from turnips, and lettuce as well as cabbage. For this process you need a stone jar or keg with a four to ten gallon capacity. Young, tender string beans, chard, spinach, dandelion greens and corn may be preserved successfully by adding enough salt to prevent all bacterial action. When you are ready to use them, simply put in a colander, run fresh water through them and cook as if they had just come from the garden.

The first secret of successful food preservation is to use young, fresh-picked, tender vegetables and fruits. In this way you preserve their vitamins and also take advantage of the full deliciousness of your home-grown crops. So do not wait to accumulate a big basket of garden produce before you start to can. Have your canning equipment ready all the time, and when enough vegetables or fruits are ripe to do a few jars, pick them and go to it (Continued on page 331)



Sugar will be made available for canning fruits and some, also, for making jams and jellies. The latter are desired for use as spreads and to relieve the demand for butter. Use of commercial pectin in preserves assures "jelling." It also helps fruit to retain fresh flavor and color and also cuts down the cooking time necessary.

Learning how to interpret the outdoors by living with it is the educational policy followed at—

National Camp

By E. DEALTON PARTRIDGE

IF some of those responsible for developing the policies of American education have their way, the outdoors will loom large in the curricula of the future. At least that is what the U. S. Office of Education, the American Youth Commission, the Educational Policies Commission and other groups have recommended officially. Camping, they say, is a method of education that should be extended to all children as a part of the school program and as rapidly as possible.

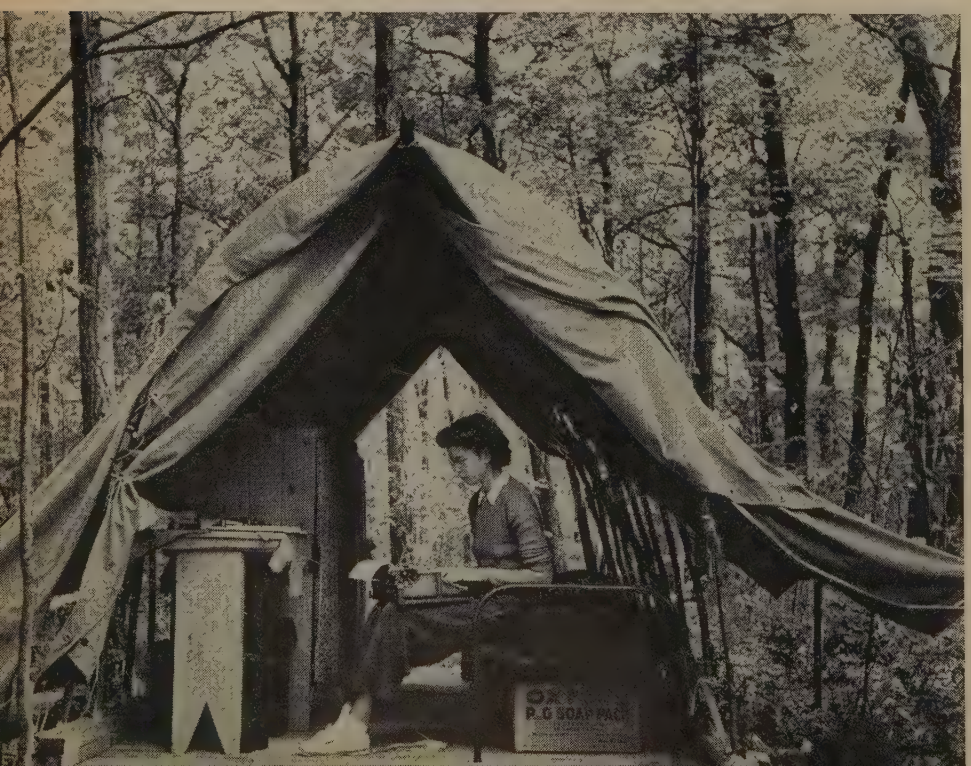
The rub comes in the last phrase—"as rapidly as possible". It is not easy for teachers trained in book-learning and classroom management to do a skillful job in leading pupils to discover and enjoy the outdoors. A survey now in progress indicates that, of several hundred young teachers-in-training, one third had never slept in the outdoors, and more than one-half said they had never hiked ten miles or more at one time in their lives. Thus, if the chart for the future is to be followed, teachers must be trained in outdoor life.

To meet this evident need, National Camp was launched by Life Camps, Inc., in the summer of 1940. It has now begun its fourth year training administrators, teachers, and youth leaders; students from twenty States and Canada have attended the various sessions.

The basic premise of National Camp, insofar as conservation and Nature education are concerned, can be summarized in two principles. The first is that the best way to teach much of the present content of education—and especially conservation—to American youth is to have them live, explore and learn in the outdoors with competent leaders who can help them solve the problems of food, shelter and daily living together. The second principle holds that the only way that this type of education can become an integral part of the school program is for educators at all levels—including teachers, administrators, college professors, state and local officials—to see and study such a program in action, and then work out a plan for administering it in their own communities.

The training offered at National Camp is unusual. It deals with a specific type of camping known both as "decentralized camping" and "camping education". This is based upon a new and different type of camping administration evolved at the three Life Camps for youngsters, and represents the idea that they learn best and grow most in the outdoors when they must solve their own basic problems of food, shelter, daily living and self-occupation. Life Campers are divided into small independent camps, each with two trained counsellors, who go together into the woods to work out their own program, build their own camp area, cook their own meals and learn about the outdoors.

There are no tennis courts, basket-ball courts, or archery ranges at Life Camps for youngsters, and the baseball diamond has grown over with grass. It is felt that, if a camp is the place to learn outdoor living and the ways of Nature, there is no point in moving into



National Campers live comfortably but simply in covered sleds fashioned after the pattern of prairie schooners of old.

Various splendid summer camps have existed for a number of years to train teachers specializing in Nature study and science, and to prepare camp Nature leaders. National Camp goes beyond this, to aid teachers and leaders in other fields of education. It also enjoys the laboratory facilities afforded by Life Camps for youngsters, carefully designed to exemplify a different philosophy of outdoor living.

the woods the apparatus that forms a basic part of recreation in the city.

Experience has shown that this type of camp life appeals to boys and girls from seven to seventeen. There is no sharp line between work and play because everything the campers do grows out of their problem of living together in the outdoors. The central area of camp is like a pioneer village. There is a trading post stocked with food for carefully-planned menus. There is a village blacksmith shop; a cobbler's shop; real man-sized tools for construction work instead of the traditional craft shop found in most camps, where campers often make souvenirs not even remotely related to the problems of outdoor living.

Camping education as practised at Life Camps has attracted wide attention. The March of Time produced one of its regular releases about it; writers wrote of the camp; educational periodicals carried descriptions. As a result a stream of visitors came to see this new approach to outdoor education in action. And it was not long before there was a growing demand for trained leaders in this new technique. This is natural, since the crux of the whole program rests on those who guide the small camp groups and the directors who train them.

It was in response to this growing demand for leaders, and for an opportunity to study camping education in operation, that National Camp was organized. At present it offers several services for professional training in camping education.

First is graduate study for mature students, teachers, administrators, state officials and other youth leaders. The six-week summer session carries six points of graduate credit with New York University. Students come with a specific problem for the establishment of camping education in their own communities, and develop this problem in consultation with camp faculty.

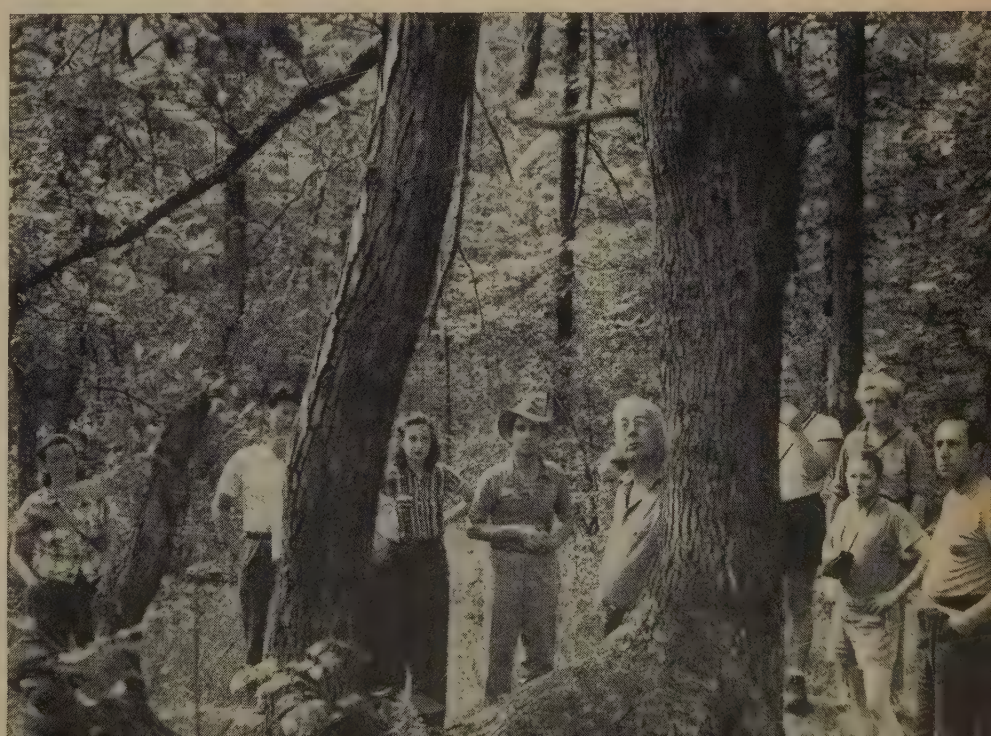
Then there are undergraduate institutes for teachers-in-training, lasting about ten days and carrying two points of credit. The first institute was held in June, 1942, at the request of the Department of Teacher Training, State of New Jersey.

There are conferences on camping education and conservation education for national, state and local educational leaders. Finally, visitors interested in camping education are welcomed.

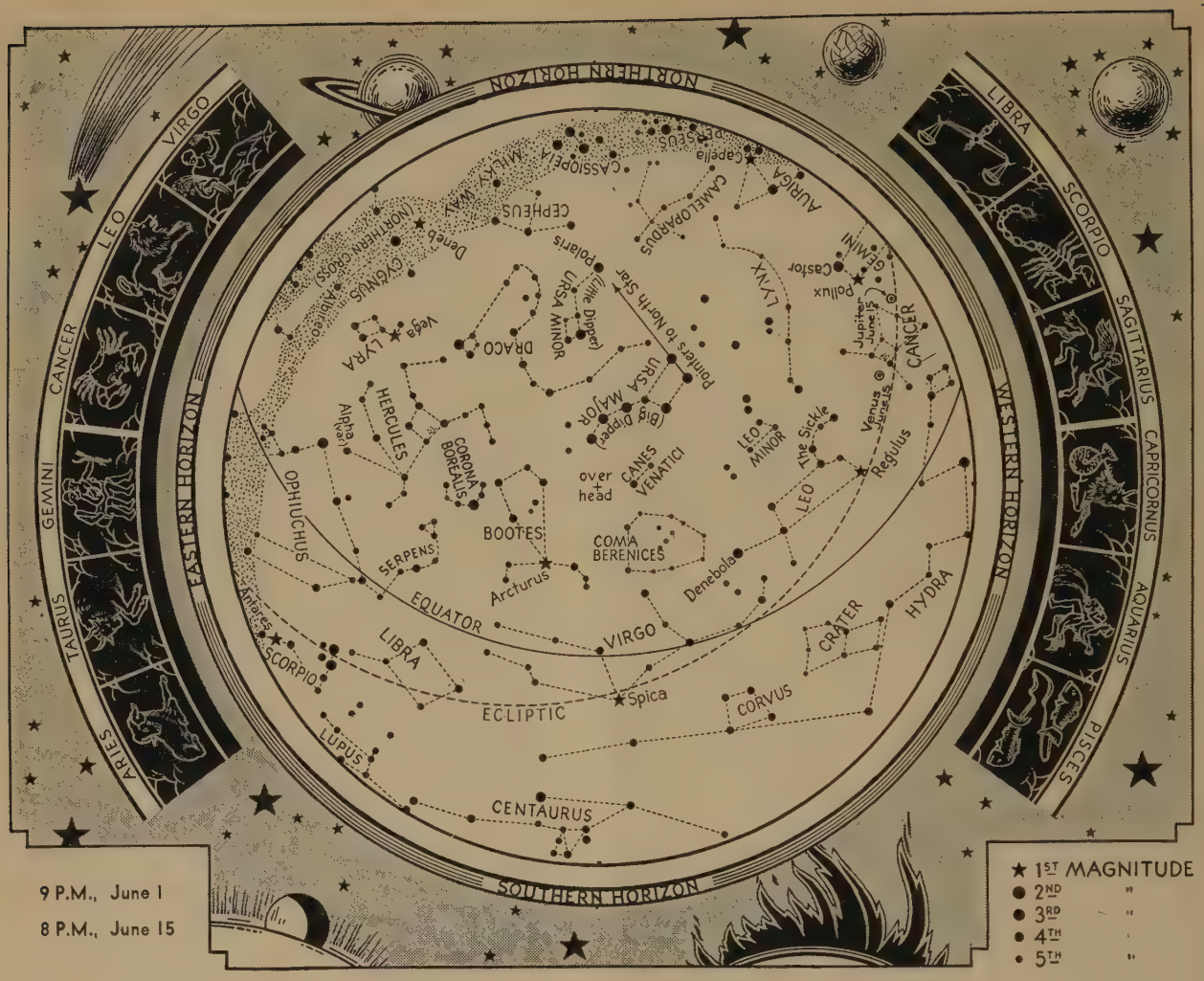
To learn the ways of decentralized camping, National Campers themselves live in small camps, build their own kitchen areas, hold campfires, go on overnight exploration trips and cook meals outdoors. There seems to be only one way to learn to use the environment in forming an educational program and acquiring the proper attitudes, and that is by actually living this type of life under skillful leadership and with ample opportunity to do research.

The graduate student can call upon the faculty for individual guidance, consult the extensive library, confer with other students, observe the administration of the Life Camps, or visit other camps nearby. Thus the course is essentially a work-shop for developing actual plans to carry forward the camping education movement.

All students at National Camp, whether they are teachers of mathematics, principals, physical education instructors, 4H-Club leaders, or camp directors, participate in a series of outdoor adventures designed to teach them the fundamentals of Nature and implant the broad concepts of con- (Continued on page 332)



Frequent explorations into the woods under leadership form an important part of the National Camp program.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

The Heavens for June and July

By ISABEL M. LEWIS

THE planet Venus will continue to be the most interesting object in the evening sky throughout these two months. On June 27 it will be at greatest eastern elongation, setting more than three hours after the sun. It will steadily increase in brightness up to the date of its greatest brilliancy, July 31. For good measure, the comparatively rare phenomenon of an occultation—meaning hiding—of Venus by the moon will be observable in the eastern part of the United States and southeastern Canada on the morning of July 6. The moon will be at the time about four days old, and the planet will disappear behind its disk shortly after the moon rises, in broad daylight. In Washington, D. C., the planet will disappear at the dark rim of the crescent moon at less than one minute after ten A.M., Eastern War Time, and will reappear at the bright edge of the moon about four minutes after eleven. For a little more than an hour Venus will be completely hidden by the moon. In the vicinity of Boston the occultation will begin and end within a few minutes of the times for Washington, as well as at New York and other points in the same part of the country. In the vicinity of Chicago, however, the moon will be below the horizon at the time of the planet's disappearance behind it, but the reappearance of the planet should be observable there at about four minutes after ten o'clock, Central War Time.

At this time Venus is so brilliant that it should be possible to find it readily even in broad daylight, especially at the time of this occultation, when it can be readily located with the aid of the moon. To observe the occultation to the best advantage, one should use binoculars or a small telescope, if available. With the aid of a telescope one can see that Venus is in the

phase of the waning crescent moon, having passed through the phase of half-moon at the time of greatest eastern elongation on June 27. Venus will also pass close to Regulus on July 7. This is the bright star at the end of the handle of the Sickle in Leo.

As to the other planets during these two months, we will find Mercury in the morning sky throughout the month of June. It will reach its greatest elongation west of the sun on June 18, but is not favorably placed for observation at this elongation, when it will rise about one hour before the sun. The planet will be still more unfavorably placed in July as it draws closer to the sun, and to superior conjunction with it on July 17. It will then pass from the morning to the evening sky and will continue to be too close to the sun to be seen for the remainder of the month.

Mars is now coming into fine position for observation in the morning sky. In June it rises several hours before the sun, almost due east, and is high in the southeastern sky at sunrise. Its distance from the earth is steadily decreasing and it now rivals the first magnitude stars in brightness. It will be easily recognized by its ruddy color, and will remain in the eastern morning sky throughout June and July. During these two months it will pass from Pisces into Aries.

Jupiter will draw closer to the sun during this period, and will be lost to view in the evening twilight some time in July. It will be in conjunction with the sun on July 30, when it will pass from the evening to the morning sky. On June 1 Jupiter will be in conjunction with Venus. The two planets will then be only a short distance due south of Pollux, in Gemini. Before the end of June Jupiter will pass from Gemini into Cancer.

Saturn is too close to the sun to be seen in the evening sky early in June. It comes into conjunction with the sun on June 7, and then passes to the morning sky. It will not be visible in June but will appear in July low in the northeastern sky before sunrise, gradually improving its position until, by the end of the month, it will rise about three hours before the sun. It will remain in the constellation of Taurus during these two months, some distance northeast of the Hyades, resembling a pale yellow star of brighter than first magnitude.

To the southwest of the long straggling constellation of Virgo, which is the largest of the zodiacal constellations, lies the small, compact, little group known as Corvus, whose brightest stars, of third magnitude only, are in the shape of a quadrilateral. We call attention to this group because when we see it on the meridian due south we may know that, at the same time, the famed Southern Cross is also on the meridian, although too far below our southern horizon to be

seen north of the latitude of southern Florida. In size it differs very little from Corvus, but two of the stars that outline this beautiful little gem of the heavens are of first magnitude, one of second, and the other of third magnitude. Its beauty is further enhanced by its magnificent background; for it is embedded in one of the most brilliant sections of the Milky Way, in the constellation of Argo Navis, near the "Coal Sack", one of those dark regions often found in the midst of dense star-clouds. This is one of the most beautiful regions of the southern hemisphere of the heavens and rides high overhead in the latitudes of Buenos Aires and Melbourne in the southern winter.

In our northern summer Spica in Virgo, Arcturus, in Boötes, and Denebola, which marks the tip of the tail of Leo, form a huge triangle that is one of the characteristic configurations of this season. Later, on midsummer evenings, appear the brilliant constellations of Scorpio, with its fiery Antares, and Sagittarius, with its little inverted Milk Dipper. Scorpio, with its long tail curving toward the south and outlined by many brilliant stars, is the most brilliant of all our summer constellations. Here, as well as in Sagittarius, is one of the most brilliant regions of the Milky Way, and when seen in the tropics at its best there is no part of the heavens more beautiful. Two other beautiful constellations of this time of year are Lyra, with its diamond-like Vega, and Cygnus with its Northern Cross lying along the Milky Way, the upright marked by the first magnitude star Deneb, or Arided, at the top, and the beautiful double star Albireo at the foot. In these two months, also, many meteors may be seen, members of lesser swarms than the Perseids, which are due to arrive in August in large numbers. They streak unexpectedly across the heavens and add to the beauty of these summer evening skies.

★

Evening

By PAUL CHURCHER

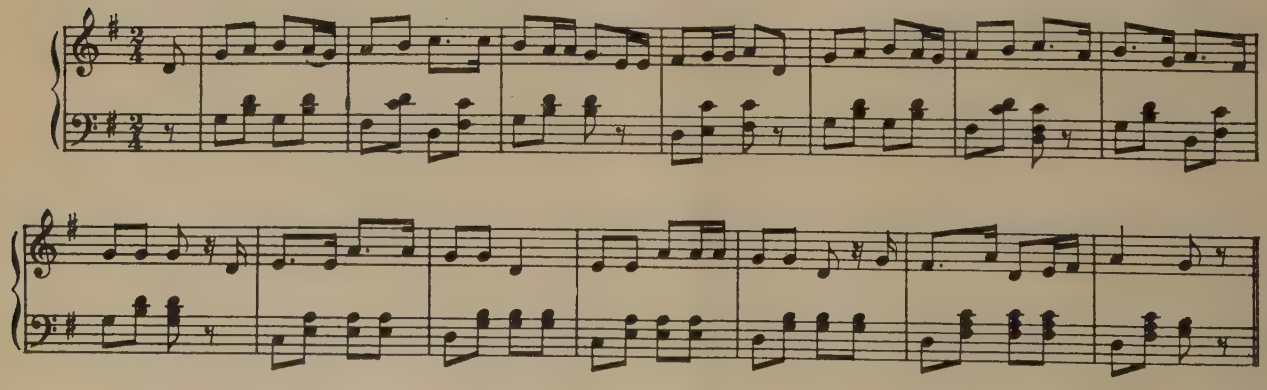
When twilight shadows lie along the river
And spruce and fir are dark against the sky,
When campfires sink to embers; when the lonely
Loon, night startled, ends his quavering cry,
Then from the silent depths of northern forests
Steals forth the loveliest music ever found—
A White-throat's plaintive, vesper song to evening,
Could starlight whisper, this would be its sound:
A few shy notes of wilderness enchantment,
A melody that all of beauty knows.
Let there be forests, always, dark and waiting . . . . .
A White-throat singing where a river flows.

★

The Hunter

Words and music by GRACE KEIR

Reproduced from "Songs of the Open" by special arrangement with the publishers, Carl Fischer, Inc.



Each silv'ry mole and brown muskrat,
Each weasel sly, and black skunk-cat
Were killed by the hunter in those days
Because he said, "It surely pays!"

Chorus:
Ah—ha! ha! hay!
Ah—ha! ha! ho!
In and out
Through the woods we go;
We'll have them all by tomorrow.

But now that woodcraft has come in,
We know that it's an awful sin
To kill our woodland friends off so—
If you must shoot, use a camera—Go!

Chorus:
Ah—ha! ha! hay!
Ah—ha! ha! ho!
In and out
Through the woods we go;
We'll have them all by tomorrow.

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The School Page

By E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

SUMMER CAMPING, 1943

WHEN President Roosevelt told Madame Chiang that the Allies would help China as soon as the Lord would allow, she very appropriately came back with the statement that the Lord helped those who help themselves. Many of those who have been accustomed to look to organized camps to take their children off their hands for the hot, sticky months will just have to help themselves. Transportation, food rationing, priorities on equipment, and labor difficulties are now forbidding. Some of these who have run their camps for the financial returns that came to them will have to seek other lines of profitable activity. Those who have run their camps primarily with the interests of children at heart will find a way, as they always have and we hope always will.

A few years ago you could get highly-trained, experienced and reliable counsellors for the dollar a dozen many camp directors thought excessive pay. Today, you cannot get these young people at any price because they are camping on the trails of our enemies, or working in more remunerative war work. A few years ago, your tents could be repaired, unless you felt that camping should be done in snug cabins with running hot and cold water. Today, priorities freeze much of the equipment and supplies.

A number of years ago Dr. James West, who was then Chief Scout Executive of the Boy Scouts, asked some visiting European scout leaders, who had just visited some of the more elaborate scout camps, what they thought was the next step in scout camping in America. I will never forget the expression on his face when one of the visitors proposed that sticks of dynamite be exploded under most of the camp headquarters. Somehow the suggestion took, and I believe that the decentralizing of camping activity in Scout camps in this country dates from that entirely appropriate remark. It rather looks as though decentralization progress might be accelerated under the present circumstances.

One of the finest things about the Life Camps is the seriousness with which they have followed this idea, and the way in which they have broken up the approximately three hundred children they care for into groups of around six or eight with two counsellors to care for the needs of each group. Followed to the ultimate, this might call for the child going out with one counsellor alone, but this would overlook the superior opportunity camping offers to develop the social side of the youngster. Any gathering of human beings who can learn to withstand the hardships of camping with a bunch of others of their age, and end up by making friends rather than losing them, are having a distinctly worthwhile experience. If camping gives no other schooling than this kind, it could justify itself in these days of worldwide misunderstanding. No, we cannot let camping as an educational effort lapse just because we cannot do it the way we may have done it in recent years. In fact, the present situation may be just what the camping movement in America needs.

The first summer I spent in an organized camp was exactly thirty years ago. I went to the camp to serve as naturalist. I spent a good portion of my time grubbing in the forest to make a tennis court, and playing baseball in a newly-cleared field—much to my disgust. The athletic director who ran the camp could not conceive of wholesome physical development taking place independent of a ball field and tennis court where he could demonstrate his prowess. Neither could he understand why for years he had to change Nature counsellors every year. I hold no brief for a summer camp being wholly a Nature camp simply because my interests are in that direction, or for any other reason, but I do believe again that Life Camps have pointed and are pointing the way when they get the youngsters to live comfortably in and with the things offered by an only slightly-modified natural terrain. Not every camp can have the excellently-equipped central camp to be found in Life Camps, nor can every camp afford the leadership there provided. Thus, in some respects the conditions there may be abnormal, and approach the ideal rather than the practical. Long may these camps and their leaders continue their pioneering in the teaching of pioneering to children and to adults. And always may it be hoped that an increasing number of educators go to see for themselves what the Big Chief Sharp and Cap'n Bill Vinal are up to at the edge of that lake that is the home National Camp.

In time of war, any human activity that helps anybody to be less dependent on his fellow men is worthwhile. If we can raise in a garden food that normally we got by depending on railroads, canners, and chain stores, then the facilities of these agencies can be freed to serve our armed forces. Gardening or food-getting may this summer be closely associated with camp activities. Natural foods from wild sources may be gathered wisely, cured intelligently and taken home by the campers to relieve the drain on the ration card. A cat-tail swamp may be made to yield more than mosquitoes to our modern outdoor folk, just as it yielded an abundance to the Indians not so long ago. Can your youngsters get this help in the camp to which you may send them?

Furniture in your home cannot be easily replaced during the war period. Learn if your camp is prepared to teach your children how to make from reeds and rushes a cane seat for a dilapidated chair. If you ask the camp director to provide this help, you can bet your bottom dollar that the director wants your business badly enough to see that it is provided. Do not accept, as evidence that crafts are being taught in camp, any elaborate exhibits of metal work and woodcraft that consist merely of prefabricated stuffs provided by some supply house and tacked together by indolent children. Insist that the children learn to make things "from the raw". This can be done—and will be done—if enough camp patrons ask for it. It is distinctly practical in these times.

It may not be possible for you or your camp to get expensive sleeping bags and tents this summer because these things are needed by our fighting men. This should be encouraging rather than discouraging since it stimulates ingenuity. A roll of old tar paper and a few blankets wisely folded should provide the essentials of a sleeping bag, provided the camp director is not sufficiently wood-wise to make adequate shelter without such accessories. Of course, these things do not cost as much as what the director may have planned to provide, but that should mean that he need not charge so much for the camping fee, thus leaving

more for you to put into war bonds in your own name.

No one can question the probability that many young campers, who will this summer be enjoying the freedom of the great open spaces, will next summer be in the armed forces. Since this is the case, the camp may well be the basis of a practical pre-induction program. Cooking weinies on a stick is not camping, no matter what the camp director may think or try to tell you. One little overnight hike some time during the summer when the weather is likely to be good is not outdoor living of the type some of your children will be doing in any month of 1944. If your camp director has not himself taken a group of youngsters safely for a week on a trip, carrying the necessary supplies on the backs of the party, and brought the group back happy and reasonably rested, then you might better look for another camp where such leadership is provided. What your children may learn about living outdoors may be infinitely more important than what they will be taught in regulation pre-induction courses prepared by persons who would be lost if they could not see a subway entrance close at hand.

Here are a few things about which you should get enthusiastic responses from your child when he comes back home in the fall of 1943. Ask him how he found his way through the woods at night. Ask him how he knows whether it is safe to wade a swift stream, and whether he should try to wade a swift stream with a light load or with a heavy load. Ask him why when crossing a high log with a pack he shifts his load to a tump-line rather than using his back straps or pack-board. Ask him how to make a fire give heat where it is wanted, and smoke also where it is wanted, if it is wanted at all. Ask him how to cook a meal outdoors and get all of the courses done at one time with a minimum of energy, fuel and waste. Well, keep on asking these things, and if your youngster has had the right kind of experience, the conversation will go on far into the night. If you wish to apply a screening test to the camps that solicit your patronage this summer, then ask the above questions of your camp representative. If the conversation stops abruptly, let the interview stop also.

The insert in this number of the magazine may give you some help on running your own summer camp with just yourself and the kids. The supplementary references suggested should be rich enough to help any intelligent person get along somehow. If war conditions freeze out a lot of our summer camps, it will not be so bad after all because those offering a wholesome program will be able to make their influence felt just that much more. I know one city man who slept in a pup tent with his son in his front yard a good portion of the summer. Anyone who says that family is not closely knit just does not know what a happy family life is. Do you have the intestinal fortitude to try this with your youngsters? Here is hoping you have a fine summer camping with your own family—in the backyard if necessary. And remember to put the money you save into war bonds. Remember, within a year your boy may be living for days more or less alone in the open, independent of home cooking and permanent shelter. Help him meet that crisis safely should he have to face it. You do your part this summer and he will do his next summer.

Alaskan Birds

The Birds of Cape Prince of Wales, Alaska. By Alfred M. Bailey. Denver, Colorado. 1943. Colorado Museum of Natural History. 113 pages. Illustrated. Fifty cents.

This interesting publication is based upon the notes and findings of the Arctic Alaskan Expedition of the Colorado Museum of Natural History, which in 1921-1922 spent sixteen months securing exhibit and study collections of the birds and mammals of that region. The author was a member of that expedition, and while some phases of the trip have been discussed in previous publications, it has not been presented before in anything like completeness. It is brought out at this time as a number in the Proceedings of the Museum and has a particular timeliness in view of our national concern with our Alaskan Territory. It also makes extremely interesting reading, not only for the ornithologist but for the layman.

Periwinkles

Number Seven in the *Johnsonia* series on shells of the Atlantic shores deals with the Genus *Littorina* in the western Atlantic, and is the work of Joseph C. Bequaert. Published by the Department of Mollusks, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, *Johnsonia* is, it would seem, an essential for shell students and collectors. It is available on a subscription basis. This latest addition to the series comprises twenty-eight pages.

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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 317)

refuge areas of one sort or another and that their combined acreage must certainly exceed 75 millions.

These figures alone—bare facts as they may be, although surely not unexciting—make apparent the usefulness of Dr. Gabrielson's survey of the subject to which they pertain. His book's appeal to the reader is at the same time all the greater because he himself is the nation's Number One wildlife administrator as Director of the Fish and Wildlife Service, and because he himself has had much to do with the refuge system's development. Here and there throughout the volume and in nearly all of the chapter on "Mysterious Okefenokee", which appeared in the last October issue of this magazine, the enthusiasm of Dr. Gabrielson's own observations leads him into creative descriptions, and it is to be hoped that his later writings can include at least one full-length volume devoted entirely to such expression. The present volume is, of course, too great in scope, too expository in purpose, to permit the details that make Dr. Gabrielson's wildlife descriptions so fascinating and satisfying. Yet the mere presentation of the facts about refuges, marshalled in one volume, the sheer impressiveness of the refuge accomplishment, is inspirational writing for all wildlife conservationists. *Wildlife Refuges* is a volume that not many of them would willingly miss.

For those who are forward-looking, *Wildlife Refuges* has also a peculiar timeliness, even in the midst of war. Great as are the accomplishments that it records, there are also many needs that it points out—needs that now seem most likely to be met, if at all soon, in connection with post-war programs of public works. *Wildlife Refuges* should help make it possible for conservationists to plan so effectively for such a future opportunity that the refuge system, now so well developed, can be perfected and enlarged still further.

The volume is presented in much the same sort of format as Dr. Gabrielson's previous *Wildlife Conservation,* and, like it, the new work is profusely illustrated with excellent photographs and with text maps. Unlike the earlier work, *Wildlife Refuges* does include in its text a number of reader irritants that might well be eliminated in the later editions that one hopes may follow for a work that seems destined to be indispensable for many years to come. Variations in editorial style, a very few sentences with mixed constructions, and such equivocal text references as simply "see map", when there are seventeen of them, are trivial in a work that is to be valued so highly, yet it would seem that they could be readily corrected by the editors of such a firm as The Macmillan Company. In a sort of back-handed way, these deficiencies do pay tribute to the excellent editing of the earlier work on *Wildlife Conservation,* which was handled by William H. Cheesman, who for many years had contributed to Nature in print by protecting readers of the publications of the Bureau of Biological Survey and the Fish and Wildlife Service from such irritants. His work, like that of all editors, has seldom been apparent to readers, and it may thus be not altogether unwelcome to an author and his publishers to honor in this way the valuable assistance of editors, even though the honor is in a breach rather than an observance. Certainly these observations should not detract from the wide circulation of *Wildlife Refuges,* for the book is, in fact, as indispensable to wildlife conservationists as editors are to readers.

Wildlife Refuges. By Ira N. Gabrielson. New York: The Macmillan Company. 1943. 257 pp., with 86 photographs on 32 plates, 17 text maps, bibliography, and index. $4.

Garden Guides

The Vegetable Encyclopedia and Gardener's Guide. By Victor A. Tiedjens. New York. 1943. The New Home Library. 307 pages. Illustrated by Tabea Hofmann. $.69.

The Flower Encyclopedia and Gardener's Guide. By Albert E. Wilkinson. New York. 1943. The New Home Library. 524 pages. Illustrated by Tabea Hofmann. $.69.

These two books should be reviewed together since they are companion volumes. Both are practical garden books in which the emphasis is on what to plant, how to plant it, what the soil equirements are, and other important information for the gardener. The vegetable book is, of course, most timely at this time when we are turning so much attention to supplementing our usual market supply with products of our home gardens. Nevertheless, most enthusiastic gardeners will not overlook flowers, so the garden book is also much to the point.

Useful Plants

Plants We Eat and Wear. By H. E. Jaques. Mt. Pleasant, Iowa. 1943. Published by the Author. 171 pages. Illustrated. Wire-binding, $1.50. Cloth, $2.00.

This is the latest addition to the fine Pictured-Key Nature Series—now numbering six volumes—brought out by Professor Jaques of Iowa Wesleyan College. It is, of course, a timely book, dealing as it does with the plant sources of things we now, in many cases, acquire only by benefit of ration coupons. This immediate book deals with the plants in seventy families, which comprise about ninety-five per cent of the plant sources of food for man. Of the total only twenty-seven plants relate in any way to clothing needs. In this book the fine methods of treatment and presentation found in earlier volumes have been maintained.

Colorado Mammals

The Mammals of Colorado. By Edward Royal Warren. Norman, Oklahoma. 1943. The University of Oklahoma Press. 330 pages. Illustrated. $4.00.

This, the second and revised edition of this fine book by Colorado's most notable mammalogist, was in the process of completion at the time of Dr. Warren's death in 1941. He had read the first proofs when he was stricken, and the work was carried on by Mrs. Warren, with the aid of F. Martin Brown. This book will be welcomed by all students of mammals.

Guiding Stories

Stories to Live By. By Gertrude D. McKelvey. Philadelphia. 1943. John C. Winston Co. 62 pages. Illustrated. 75 cents.

This is an attractive little book for youngsters, and adults could gain much benefit from it these days, for it is a little group of stories that carry home the message of each one of the Beatitudes. It should be welcomed in both home and Sunday School.

New World Timber

Timbers of the New World. By Samuel J. Record and Robert W. Hess. New Haven, Conn. 1943. Yale University Press. 640 pages. Illustrated. $10.00.

This volume represents the cumulative results of more than twenty-five years of continuous investigation. It is an encyclopedia of the best information available concerning the trees and larger shrubs native to this continent, and the first attempt to describe all the timbers of the entire western hemisphere exclusive of the Pacific islands. The descriptions are based on material in the Yale collections containing 40,500 wood specimens, half of them from Latin America. Botanical problems have been worked out in cooperation with specialists, and all the available literature has been searched for the latest and most reliable information.

There are descriptions of the trees and woods of more than 1100 genera of 155 natural families. Each family is considered with reference to size, distribution, and economic importance. Each genus is treated in more or less detail according to importance, including location, size and accessibility of the trees, the properties and uses of their woods and other products. Each generic account concludes with a list of the trade and vernacular names by countries.

An important part of the book is a bibliography of the principal publications, arranged by countries. In addition to the general index, there are special lists designed for convenience in locating trees and woods having special properties and uses or suitable for the same purposes as better known kinds. There are eight original maps showing the geographical ranges of Latin American timbers of commerce, 30 full-page reproductions of photographs, and 22 plates with 75 photomicrographs prepared especially to show variety of anatomical details.

A book intended not only for scientists, but for everyone interested in the utilization of American forests, it contains descriptions of the trees, tells where they grow, and attempts to evaluate their present and potential economic importance. It correlates the vernacular, trade, and scientific names, indicates the present and possible sources of rubber, resins, oils, tannins, dyestuffs, drugs and fibers, and classifies the timbers with respect to their properties and uses. Persons looking for substitutes for well known timbers, or in search of a wood for a special purpose, will find suggestions in the classified lists.

When Professor Record published *Timbers of Tropical America*, back in 1924, the book was immediately accepted as the outstanding contribution to our knowledge of the tree species of Latin America. It instantly became the recognized authority for all workers in that field, and the Bible of every tropical forester.

Timbers of the New World is a successor to *Timbers of Tropical America*—and more. It contains over twice the amount of material, and extends its fields to include the trees and larger shrubs of the entire western hemisphere. It incorporates a vast amount of knowledge that has been gained since the original publication.

The book is unique in its field—it has no competitors. The labor of collecting, correlating and verifying the material in its 640 pages must have been enormous. The results are correspondingly great. A magnificent job of book-making, and an epoch-making book.

Timbers of the New World is published by the Yale University Press on the Charles Lathrop Pack Forestry Foundation at Yale University. It may be secured from the Yale Forest School, 205 Prospect Street, New Haven, Conn. T. G.

PUTTING THE GARDEN AWAY

(Continued from page 321)

quickly while they are at their luscious prime! Two hours from garden to can is considered the ideal timing.

There are several Department of Agriculture bulletins that you will find helpful. Write for them to Superintendent of Documents, Washington, D. C., sending coin. *Home Canning of Fruits, Vegetables, Meats,* #1762—Price 10c; *Drying Foods for Victory Meals,* #1918—Price 10c; *Home-made Jellies, Jams and Preserves,* #1800—Price 5c; *Community Food Preservation Centers,* M.P. #472—Price 10c (this tells how to brine and "kraut" as well as how to organize and run a canning center); *Home Storage of Vegetables,* #879—Price 5c. Two other helpful bulletins are: *Ball Blue Book of Canning and Preserving Recipes,* Ball Brothers Company, Muncie, Indiana—Price 10c; *Kerr Home Canning Book,* Kerr Glass Manufacturing Corporation, Sand Springs, Okla.—Price 10c.

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SPRITES OF THE WHITE OAK

(Continued from page 301)

derful gnatcatcher song I had yet heard — a bobolink - catbird - goldfinch medley, miniature in volume but not in length. This he repeated with variations again and again, mostly while flitting in treetops, occasionally from a perch. Whenever missing at the nest, he was bubbling rapturously here. That evening I left his lady down below gazing uphill from the very tip of the nest-branch, calling in her most appealing manner. Whether she was voicing pleas for his return to home duties or expressing longing to follow him, I do not know.

Next morning, a plump little bob-tailed image of the parents fluttered down to a twig below the nest and set about dressing his already immaculate plumage. Satisfied, he flew up beside the nest, snuggled down, and fell asleep. At yesterday's site, his father tugged mightily to bind fast the soft gray foundation of a new home!

The old home was abandoned two days later and life centered around the new one. The tireless parents took time out from building only to feed their young in the nearest trees. Often as they gathered fuzz from adjacent oak tips or gossamer from the same bush, he uttered bits of medley and she murmured soft replies. Once they touched bills as they met at the nest.

The rush of construction ended June 20. Finishing touches were leisurely added while they played around with their offspring close by. The turn-by-turn rounds of incubation began June 26. Then suddenly—the nest vanished—completely!

Despite frustration of desire for a second brood, cheery chuckles and gentle hummings enlivened the fortnight the family lingered near, leaving with us a lasting memory of their indomitable spirit.

NATIONAL CAMP

(Continued from page 323)

servation. These outdoor experiences are organized and conducted by Dr. William G. (Cap'n Bill) Vinal, widely-known leader in Nature education.

Experience has shown that many, who have taught school for years, come to see a new meaning in education by learning to observe the relation of living things to each other. Names that have been vague words in a book come to life in a whole world of living things. The outdoor experiences include exploration of a large quaking bog; stump-scouting to learn to read the biographies of trees; reconstructing the story of a deserted village with its implications of marginal land; hiking cross-country with map and compass; rock collecting to learn the rudiments of geology; exploration along the Appalachian Trail.

National Camp is located on Lake Mashipacong near High Point State Park in northern New Jersey. The camp property of 1000 wooded acres is surrounded by more than 25,000 acres of state park and forest. Within hiking distance are the Culver Wind Gap, the Delaware Water Gap, the Appalachian Trail, Pennsylvania deposits of Matamoras shale and countless other objects for study.

The faculty of National Camp includes nationally-known authorities on camping education and Nature study, in addition to those trained in the administration of camping education. The directors and staffs of the three Life Camps are available for consultation on specific problems, and the nearby Life Camps serve as demonstrations of the camping education program in full operation.

It is the aim of National Camp to train mature people who can, in turn, set up training courses of this nature in other States. However, the type of camping advocated is quite different from the usual camp program, and calls for an appreciation of educational values and procedures as well as a knowledge of environmental possibilities. This program envisages camping as more than a recreational, summer vacation activity. By adding the word *education* to camping it implies that the method is essentially one suited to educators who are trained to use it. This is not a passing educational fad but a method of approach that has grown out of years of careful experimentation.

Is this, perhaps, the vehicle with which to follow the chart of the future?

Camping Education, the Story of National Camp, a twenty-minute sound picture produced by the March of Time is now available in both 16 and 35 mm sizes for showings before educational and similar groups for the cost of transportation charges. Inquiries should be addressed to National Camp, 14 West 49th Street, New York City.

E. LAURENCE PALMER

(Continued from page 316)

It is planned to compress a whole library of Nature guides into a single volume. Covering all branches of natural history, it will be published in such compact form that the book will slip into an ordinary coat pocket.

When Dr. Palmer purchased the old Slingerland-Comstock Publishing Company, not long ago, he made a dramatic find among the accumulated debris on the top of an ancient cabinet. Wrapped in brown paper and in perfect condition, were 268 original drawings by the great wildlife artist, Louis Agassiz Fuertes.

In the furtherance of Nature study, Dr. Palmer has been active in numerous scientific societies. Among these are the American Society of Mammalogists, the National Association of Biology Teachers, the Wildlife Society, and the Ecological Society of America. In 1927, he was president of the National Council of Nature Study Supervisors; in 1929, of the Department of Science Instruction of the National Education Association; and in 1936 and 1937, of the American Nature Study Society. He has been made a fellow of the Iowa Academy of Science and the American Association for the Advancement of Science.

In 1921, on the day before Christmas, Dr. Palmer married Katherine E. H. Van Winkle. An authority on paleontology and historic geology, she was acting assistant professor in paleontology at the University of Washington and held, for two years, a Heckscher Research Grant for study in her chosen field at Cornell. She is now lecturer in paleontology on the staff of Cornell University and a Trustee of the Paleontological Research Institution. Her scientific training and her interest in Nature have been of great assistance in Dr. Palmer's work. They have one son, Richard Robin Palmer.

A second son, Laurence Van Winkle Palmer, died three years ago. As a memorial to him, they recently purchased a nine-acre tract of woodland near their home on the outskirts of Ithaca and turned it into a natural park and sanctuary. On the winding paths and along the stony brook of this unmolested area, Dr. Palmer frequently tramps for hours while working out new ideas so that he may pass on to others the abiding delight he finds in the world of the out-of-doors.

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Under the Microscope

By JULIAN D. CORRINGTON

WHEAT STEM RUST

II. Slide Preparations

In collecting the uredospore and teleutospore stages of rusts that occur on wheat and related cereals, avoid sori on stems and choose those on leaves. For general study, for teaching purposes, and for all others save those of a critical or research nature, it matters little whether the wheat stem rust, *Puccinia graminis tritici*, or one of the many other varieties of stem rusts, as *P. graminis avenae* (on oats) or *P. graminis secalis* (on rye), or the wheat leaf rust, *Puccinia triticina*, is selected. Stems and older leaves have so much silica in them that first-class sectioning becomes very difficult. The uredospores are found on young leaves in the late spring and these present no difficulties; but the teleutospores appear in the late summer, when the leaves are well developed. Choose the youngest such leaves as can be found, and, if necessary, soak them in water for a week to soften before sectioning.

Fix the material in FAA for 24 hours (this Department, March, 1939) or FPA, a variation known as formalin-proprionic-alcohol, in which the acetic acid of the standard FAA is replaced by the same amount of proprionic acid, details of the methods being in nowise different. Material may be left in either of these fluids indefinitely and no washing out is necessary. Proceed with dehydration, beginning with the 50% strength of ethyl, butyl, or propyl alcohols, or use the dioxan method, as preferred, and infiltrate, imbed, and section according to the usual paraffin technique. Cut transverse sections of the leaves, 10 mu. in thickness and, for general purposes, stain the affixed sections with the safranin—fast green combination (see March, 1939, issue). If nuclear details are wanted, use the iron hematoxylin-orange G sequence (Oct., 1939, issue). Johansen's quadruple stain is especially effective with this material (Johansen, *Plant Microtechnique*, pp. 88-89).

Pycniospores and aecidiospores appear on young leaves of the common barberry or the related Mahonia, which may be fixed in either FAA or FPA or, still better, in Craf I (20 cc. 1% chromic acid, 75 cc. 1% acetic acid, 5 cc. commercial formalin). Cut and stain as for uredospores. Whole mounts of the various spores may also be prepared but, except for special purposes or to obtain the basidiospores, add little to the information gained from sections. Teleutospores can be germinated in distilled water, though authorities disagree as to the length of time necessary to obtain the basidiospores.

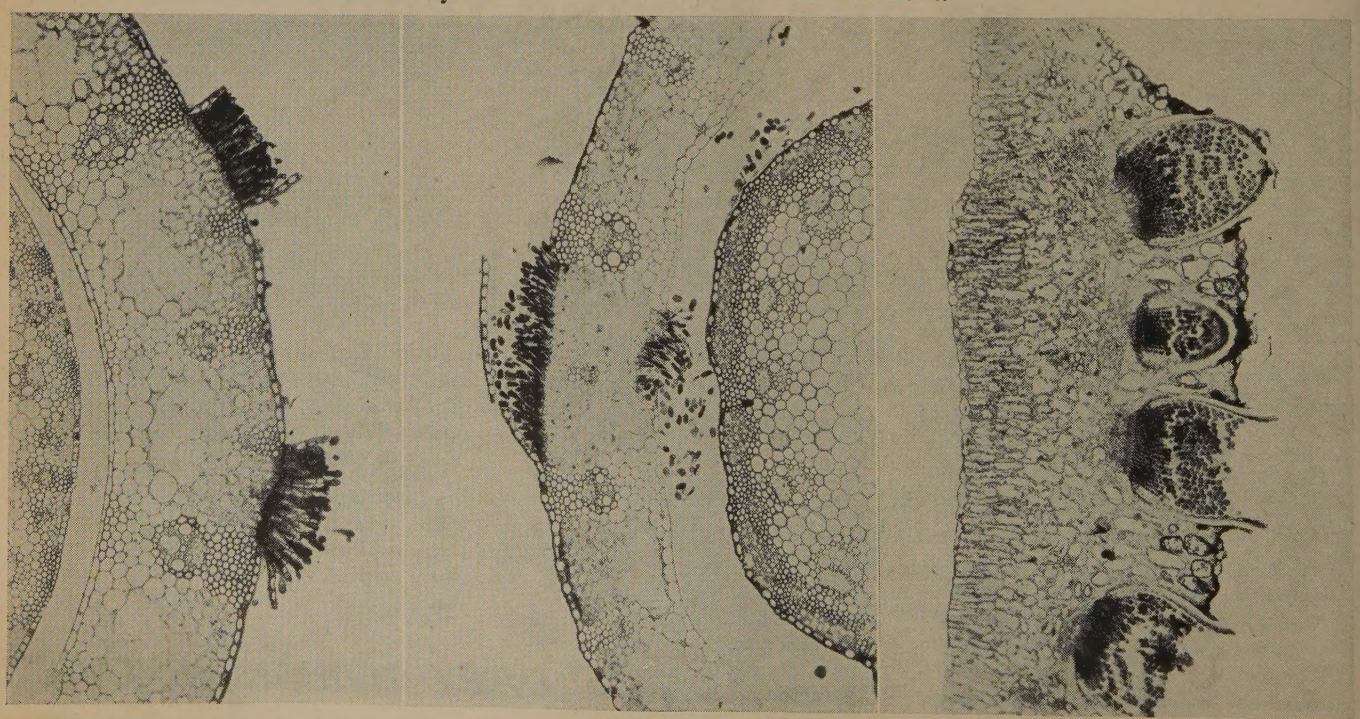
BIOLOGICAL LABORATORY MANUALS

IV. Comparative Anatomy

In offering material for a course in comparative vertebrate anatomy, the author of a laboratory manual is faced with two sets of two choices each: first, shall the manual present a brief dissection of many forms—usually one from each main group in the phylum—or shall it confine itself to a more detailed survey of a very few? The first plan is, of course, the more comparative of the two, but is also the more superficial, and tastes of instructors differ. Secondly, is it better to dissect a single animal completely in consecutive laboratory periods, then start all over and do the same with the next animal (type method), or should the student work out, for example, the skeletal system in each of the forms in phylogenetic order, then begin another system of organs (system method)? Tastes differ here too, but the tendency today runs strongly to the system plan, using few forms.

One of the oldest and best known manuals in this field, system method, was that of Libbie H. Hyman.

From left to right, section of wheat stem and leaf showing teliospores; section of wheat stem and leaf showing uredospores; section of barberry leaf with aeciospores in aecial cups. All magnified 120X. Slides courtesy Ward's Natural Science Establishment.



Some teachers objected to this 380-page book on the ground that it transgressed the customary functions of a laboratory manual and incorporated much, but not enough, text-book matter. Now appears a revision that is essentially a new work, and is a complete text and manual in one volume, titled *Comparative Vertebrate Anatomy*. It fully lives up to what we had expected from this gifted author and scientist. The coverage is very full, the presentation detailed, clear, and concise, and the format most pleasing. The first five chapters are concerned with generalities and introductory material, as animal form and topography, lower chordates, external features and development, then follow nine chapters on the several organ systems.

Textual treatment comes first in each chapter, in smaller type, followed by laboratory directions, interrupted at appropriate places by discussion. The numerous illustrations clarify the explanatory matter but do not infringe on laboratory originality. As to forms considered, there is much more work outlined than could be accomplished in the usual course, leaving the instructor a wide latitude of choice. Emphasis is on shark, necturus, and cat, but generally the turtle and pigeon are also covered, while in most places the skate is given as an alternative form to the shark, and the rabbit for the cat. There is a pronouncing glossary, an appendix on methods, and a good index. Miss Hyman has read and worked very extensively in preparing this volume, and has brought together the essentials from a vast amount of research, making the book modern and authoritative. The proofreading leaves something to be desired, but errors of this nature are less important than those of fact and will doubtless soon be corrected. Pp. xx, 544; figs. 136. University of Chicago Press, 5750 Ellis Ave., Chicago, 1942. $3.50.

The few-forms system method is well exemplified by W. C. Senning's companion books, *Laboratory Studies in Comparative Anatomy* and *Outline Drawings for Laboratory Studies in Comparative Anatomy*, the first being a bound volume of ix, 188 pages and 15 figures, the last a portfolio of 72 beautifully executed outline drawings, notebook size on heavy paper, perforated and punched for removal if desired. The directions are unexcelled for the four c's—correctness, completeness, clearness, and conciseness, and include the barest minimum of explanatory or textual matter. This manual works well with any of the standard texts on the subject, and confines a full year's study to careful dissections of the three main types only—shark, necturus, and cat. Students are graded mainly on their work in the laboratory and their ability to explain and demonstrate their dissections in oral quizzes, the drawings, when completed, titled, and labeled, serving as a record of the work and expressing an understanding of morphological relationships by means of specified coloring. McGraw-Hill Book Co., Inc., 330 W. 42d St., New York, 1937. Manual, $1.75; drawings, $1.50.

Similar in general plan but using the type method are the *Guide to the Study of the Anatomy of the Shark, the Necturus, and the Cat*, and the *Atlas of Outline Drawings of the Dogfish Shark, the Necturus, and the Cat for Vertebrate Anatomy*, by Eddy, Oliver, and Turner. Treatment is topographic, as per the method of teaching human anatomy; the shark is taken up first and worked out completely before going on to necturus, the order of dissection being abdomen, gills, tail, and head, in each of which all contained systems of organs are serially described. Directions are clear, interesting, and well adapted to impart as much knowledge of the subject as is possible in a one-semester course. Certain portions of the skeletal and muscular systems are not fully covered, since there must be condensations somewhere. The Atlas contains 77 very fine outline drawings, perforated, punched, notebook size, for use by the instructor as he may see fit, chiefly in the manner detailed in the preceding paragraph. Both books are bound in light blue kraft, with dark blue printing and cercla binding, the combination being decidedly attractive; the type used in the Manual is large and black, a distinct advantage in the laboratory. Manual, pp. vii, 100; figs. 15, 1939, $1.50. Atlas, 1940, $1.50. John Wiley & Sons, Inc., 440 Fourth Ave., New York.

Simplicity and a rigid adherence to dissection instructions alone, without any trimmings, keynote the *Laboratory Directions for Comparative Vertebrate Anatomy*, by I. E. Gray. These notes are the briefest we have seen, yet are remarkably clear, complete, and serve well for identification. No morphology, specifications for drawings, illustrations, appendices, or index are included. Details as to how the course is to be conducted in the matter of quizzes and drawings are left to the instructor, hence this manual is adaptable to a wide variety of

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San Jose, California

tastes. The material covers one semester of work and is limited mainly to shark, necturus, and cat, system plan. Fabrikoid, flexible, washable cover, wire binding, and a diverse selection of sizes and styles of type present the material in pleasing and useful form. Pp. x, 80. The Blakiston Co., 1012 Walnut St., Phila., 1938. $1.

George E. Potter contributes the workbook design in his *Manual for Comparative Anatomy*, a lithoprinted set of 293 pages supplied loose in an envelope, punched for ring binders, and with numerous outline drawings. The type method, with many forms, is employed, but so arranged as to permit use of the material by the system method, if preferred. Dolichoglossus, Molgula, Amphioxus, and the lamprey are followed by two sharks as alternative examples, Squalus and Reniceps; then external features of the ray and skull of the perch. Necturus, horned lizard, fowl, and cat all receive detailed study. In many cases the student is asked to demonstrate his dissection or recite; in others to make drawings on blank sheets provided for the purpose; and in still others to finish and label prepared drawings that are in various stages of completion. This is an exceedingly well done and carefully worked out manual that should be examined by all who instruct in this course. C. V. Mosby Co., 3525 Pine Blvd., St. Louis, 1941. $2.00.

A very fine plan, quite different from the others, is brought out in the *Manual for Comparative Anatomy* of Leonard P. Sayles. Instructions are in outline form, with a minimum of explanatory matter, and appear on left-hand pages only, the right sheets being blank, for student notes and drawings, or are here and there occupied by helpful illustrations. Names of structures in boldface type run down the left margin of the page, facilitating survey and review, and subheads are indented; dissection directions are in italics. The system method is followed and the chief forms worked up in morphological detail are the shark, necturus, and cat. However, many others are introduced if and when the author believes certain transitional stages or points need exemplification by laboratory material, demonstrations, slides or, in fact, any sort of exhibit that will make the history more vivid to the student. The quiz method of grading is advocated and no directions for making drawings appear in the manual, such administrative decisions being left to the preference of the instructor. This manual is very comprehensive and will fit well with any full year course. Pp. xi, 214; figs. 55. Notebook size, board covers, wire-o binding. The Macmillan Co., 60 Fifth Ave., N. Y., 1938. $1.60.

A compromise between the two general methods of presentation is advocated by Little and Kempton in *A Laboratory Manual for Comparative Anatomy*, a printed and bound volume. Many radical and interesting departures from the more usual treatment are included. The authors have found that best results have been obtained by making a complete study of the dogfish according to the type plan, then following the system method thereafter; but a separate table of contents is included for those who wish to use the type plan throughout. Amphioxus is given first, then the dogfish, a chapter on the classification of vertebrates, one each on histology, the endoskeleton, exoskeleton, and external anatomy, followed by five chapters on the remaining systems, and ending with four appendices on methods, and a glossary. Outline drawings for completion and labeling are provided and a unique feature among these is the inclusion of several diagrams of skulls of fossil vertebrates. In number of forms this manual allows ample choice: necturus, turtle and alligator, pigeon, cat and rabbit. Both instructions and discussions are given, but no attempt is made to have the book serve as a text. Pp. xix, 286; plts. 19. The Macmillan Co., 60 Fifth Ave., New York, 1928. $2.50.

As an example of a work that employs the straight type method, with numerous forms, we may cite H. S. Pratt's *A Course in Vertebrate Zoology*, now in its third edition. Amphioxus, lamprey, dogfish, perch, necturus, frog, turtle, pigeon, cat, and rabbit are presented in straight descriptive style, with structures in boldface type as serially encountered by the student, without discussion, morphology, or illustrations. Drawings to be made in their entirety by the student are indicated. The author has long been noted for exactness and for his lucid style in writing clear directions. Pp. xii, 362. Ginn and Co., 70 5th Ave., N. Y., 1938. $2.20

BIOLOGY TEXT

In *General Biology for Colleges*, Professor Gairdner B. Moment, Goucher College, has produced a well organized, well written, and interesting text. Beginning with a new type of chapter on the foundations of biology, the work then plunges at once into the universal characteristics of living things, followed by principles of classification. A survey of the plant world and plant physiology, then animal structure, functions, and classification, occupy the bulk of the volume, and toward the rear are chapters on development, heredity, evolution, and paleontology. In keeping with present trends, the emphasis is physiological.

Dr. Moment writes with an engaging and easily comprehensible style. Few of his numerous illustrations are new, yet they have evidently been selected with special care from a very wide variety of sources, and we found them well suited to their rôle of text adjuncts and interest stimulators. The book is very modern, with latest physiological and experimental findings, yet includes many accounts of the origin of biological knowledge and presents some of the classical experiments, often illustrated with old wood cuts. This volume is suitable for a wide variety of courses and is exceptionally good for the independent layman. There is enough technical material as preparation for future specialization, yet the contents are sufficiently broad and popular—in the scholarly sense—to serve those who will not pursue the subject further, and the educational value of the book is high. Pp. xix, 661; figs. 346; reference lists, glossary. D. Appleton-Century Co., 35 W. 32d St., New York, 1942. $4.00.

WEIGHTS FOR COVER GLASSES

Thick mounts often require weighting of the cover glass while drying, to prevent the object from curling or to keep it flat. Material under compression or subject to curling is apt to arch up, open a channel through the balsam to the exterior, and thus allow entrance for a large air bubble.

One of the best weighting devices is a piece of brass spring wire bent into a bow. One limb is straight, horizontal, and hammered flat, and is placed under the slide, just beneath the mount, and extending at a right angle to the long axis of the slide. From a point half-an-inch beyond the slide, the wire is bent back sharply, arching up over the slide to a point immediately over the center of the cover glass, where the end is bent down at a right angle to a vertical position. If the upper limb touches the lower when this clip is not in use, then the two must be pulled apart slightly to insert a finished slide, and will exert enough pressure.